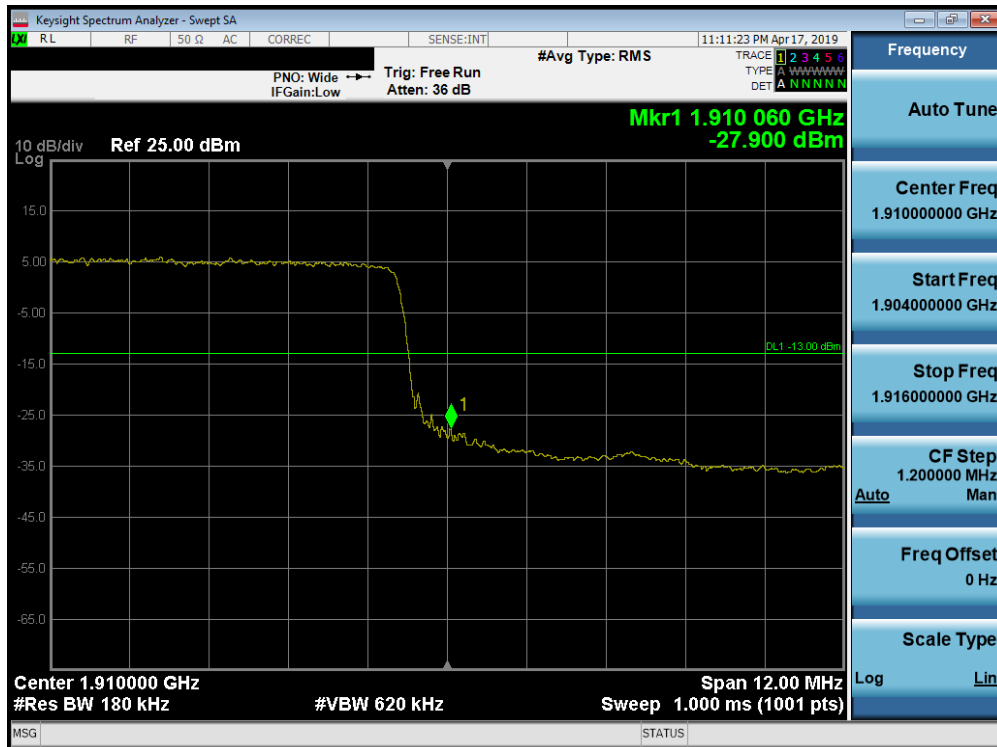
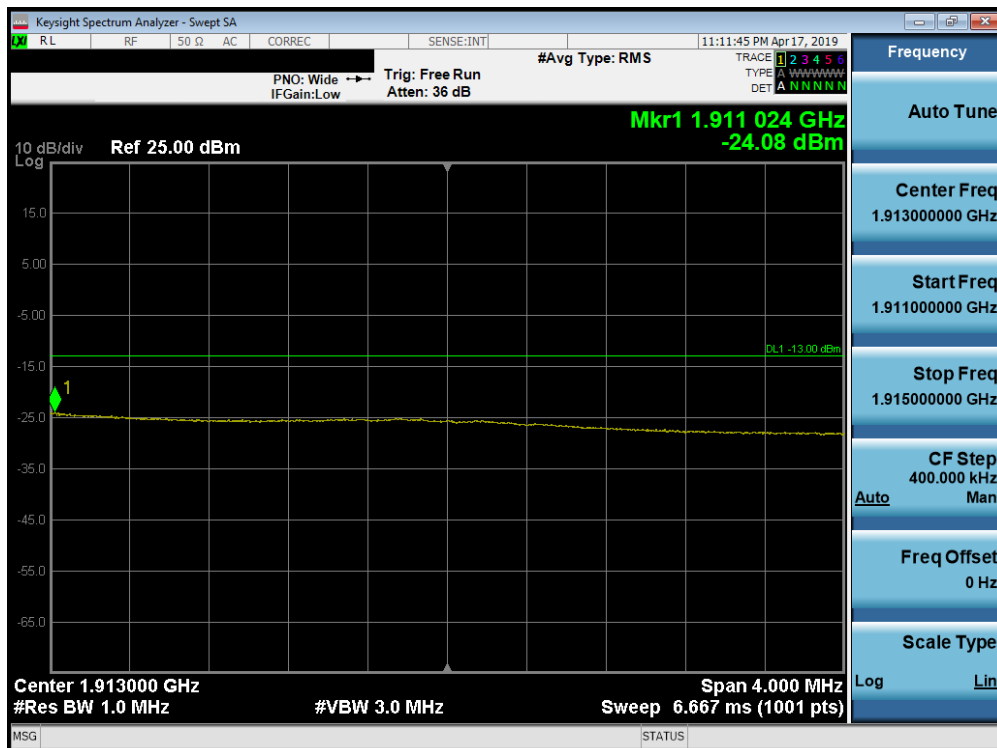


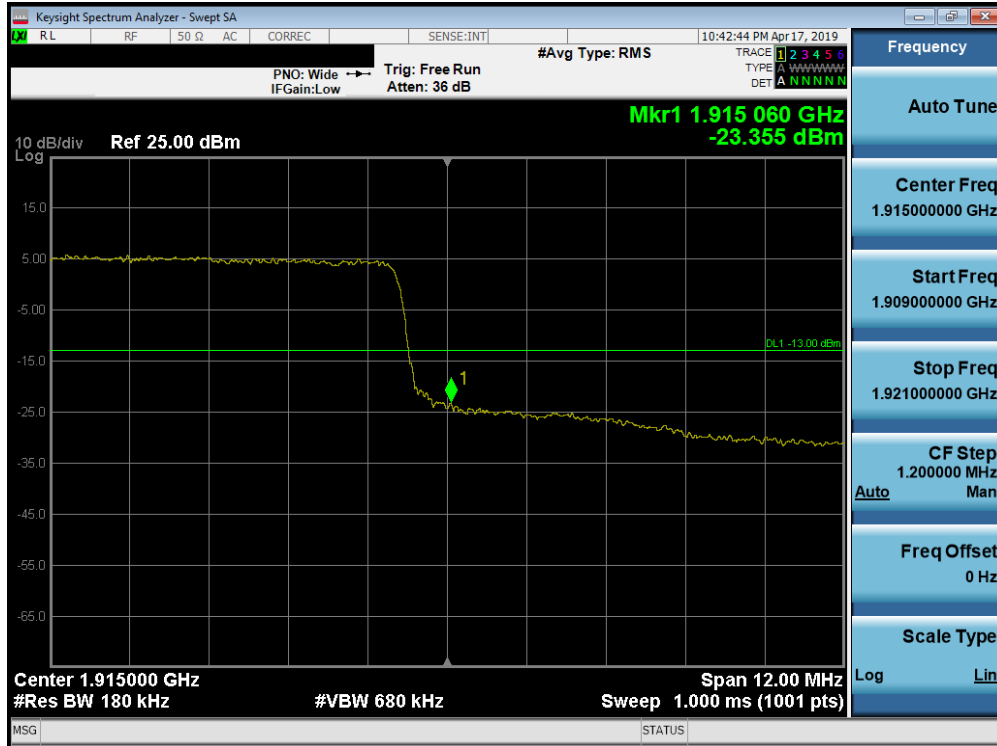


Plot 7-291. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

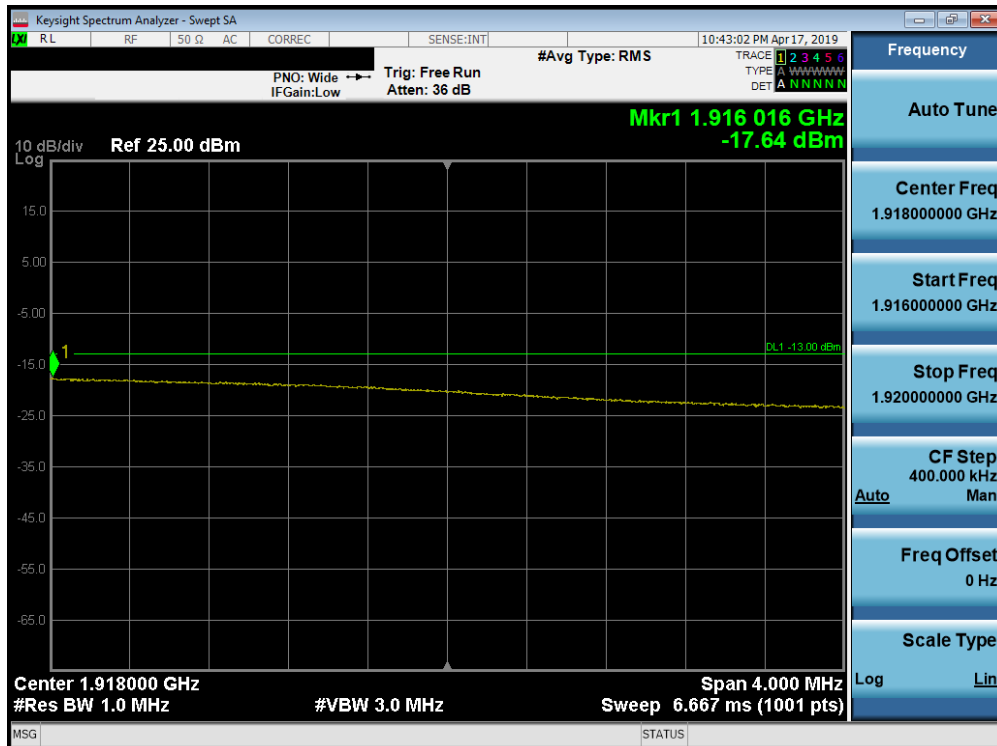


Plot 7-292. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 170 of 271

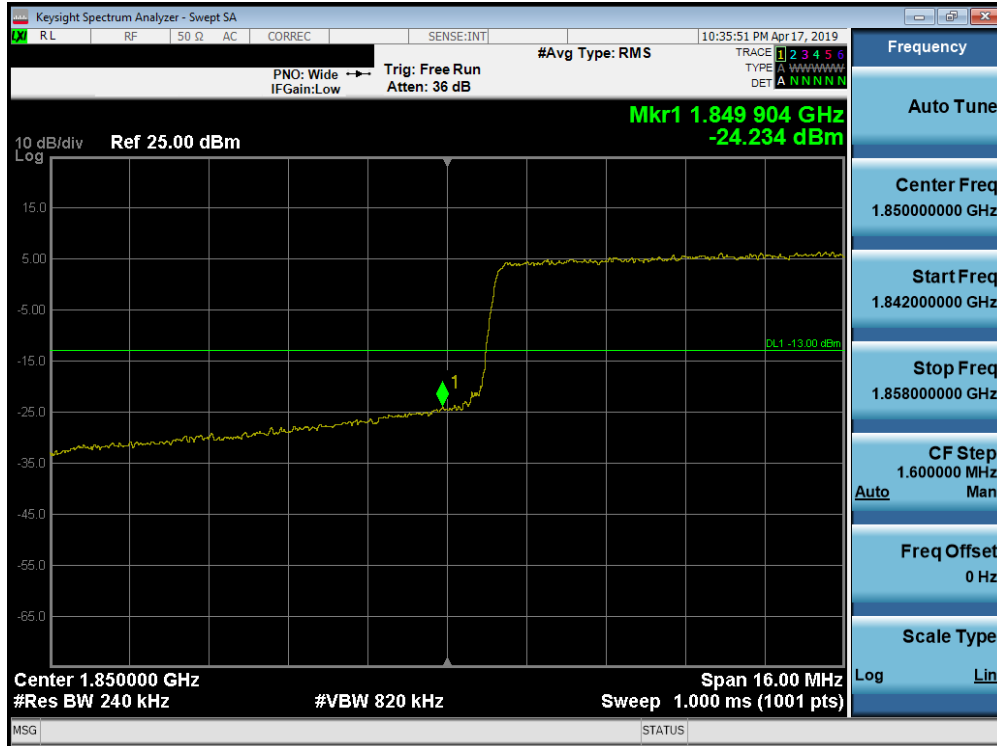


Plot 7-293. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

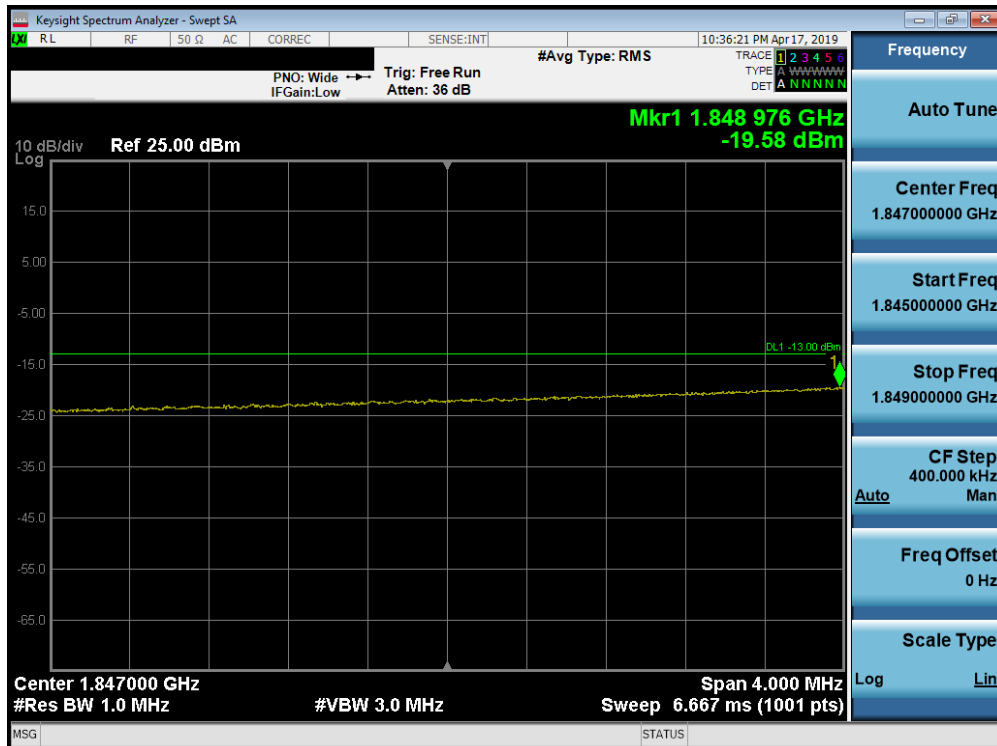


Plot 7-294. Upper Extended Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 171 of 271

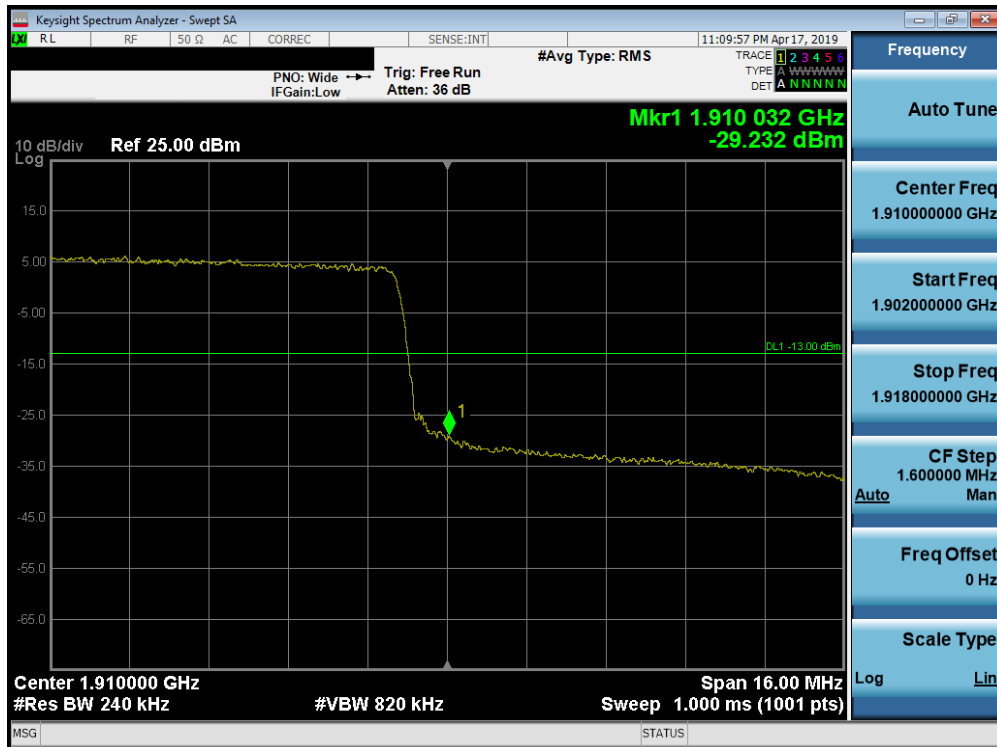


Plot 7-295. Lower Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

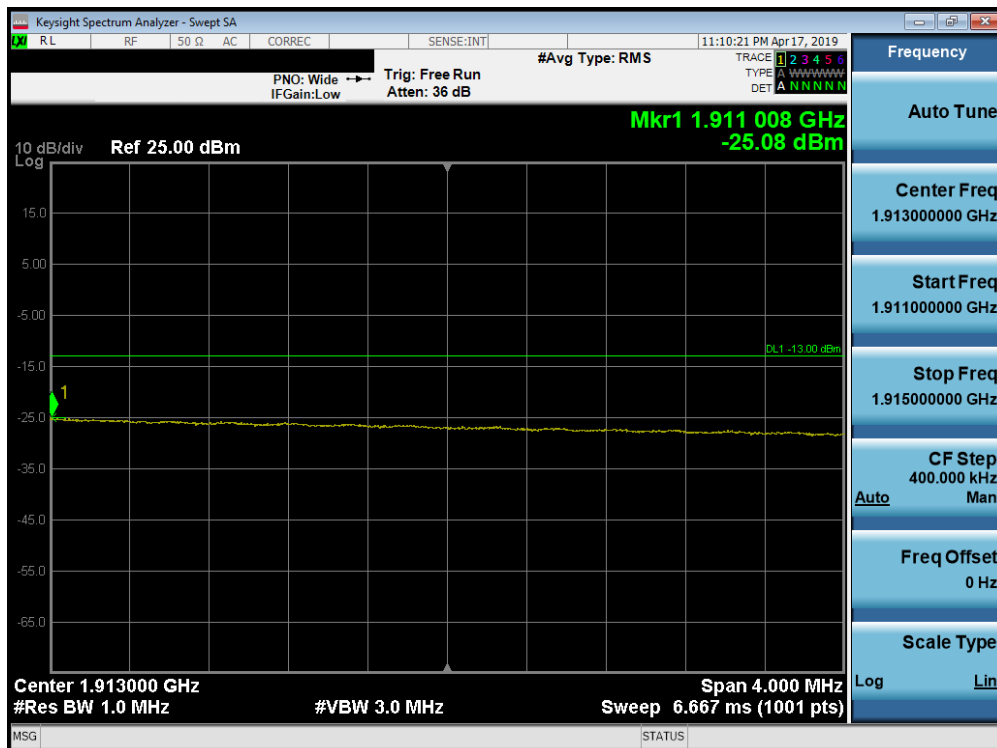


Plot 7-296. Lower Extended Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 172 of 271



Plot 7-297. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

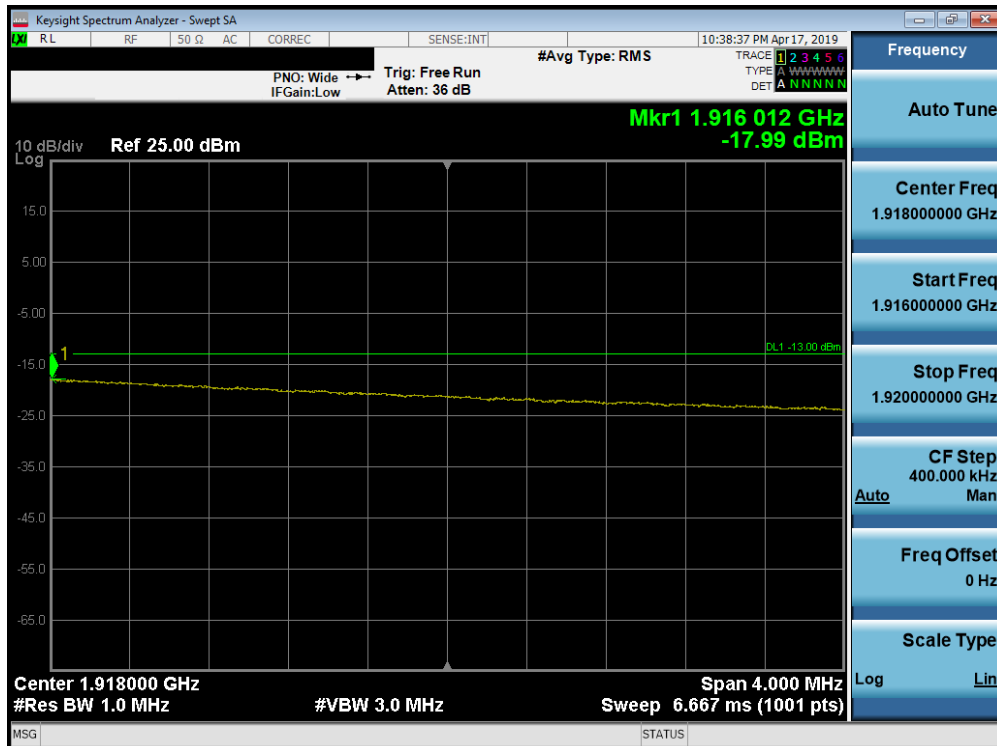


Plot 7-298. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 173 of 271



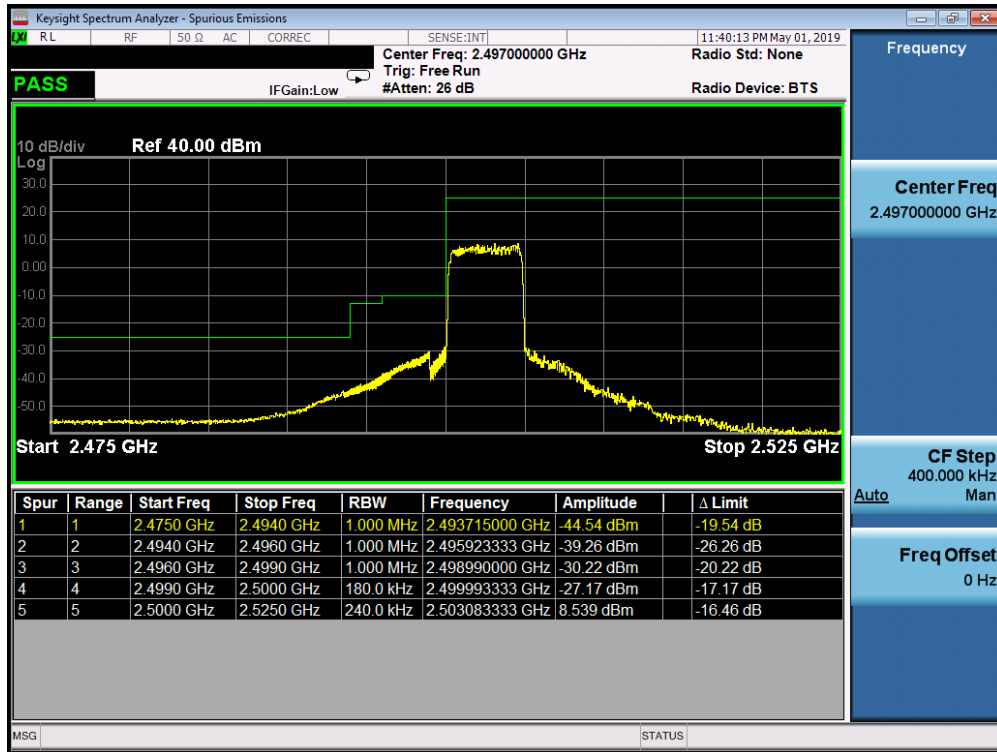
Plot 7-299. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)



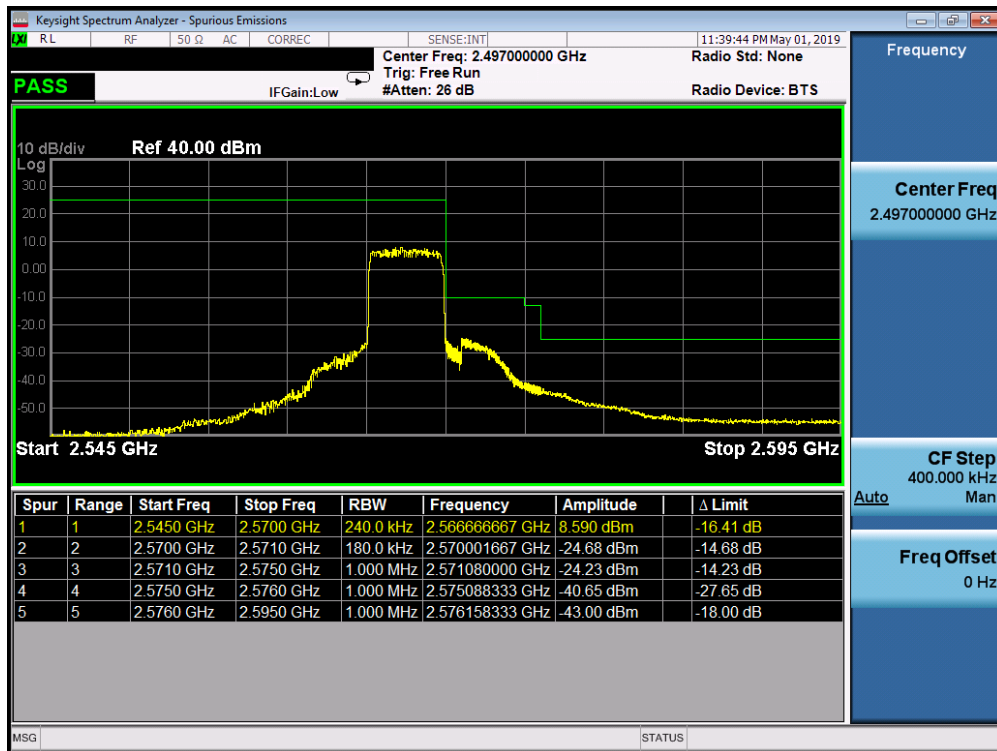
Plot 7-300. Upper Extended Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 174 of 271

Band 7

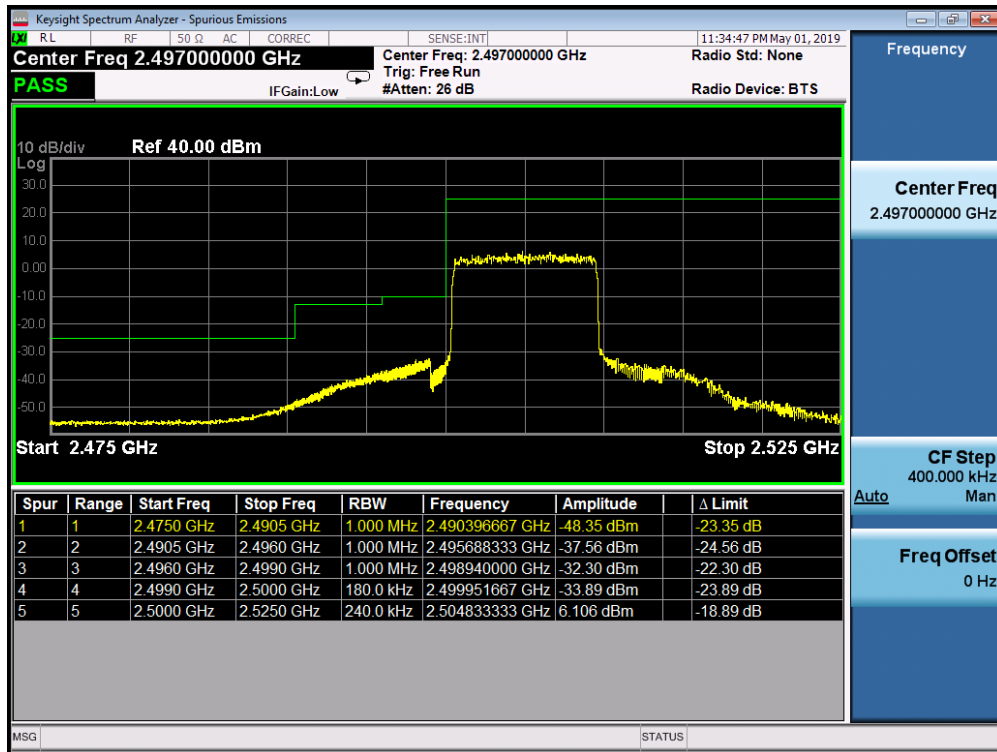


Plot 7-301. Lower ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

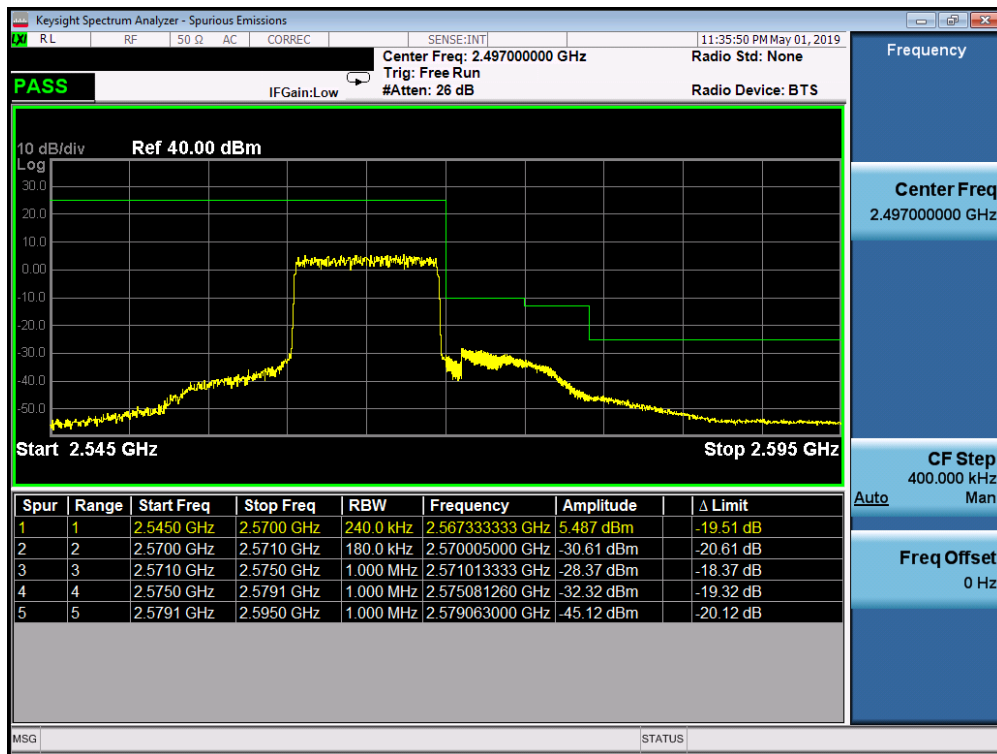


Plot 7-302. Upper ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 175 of 271

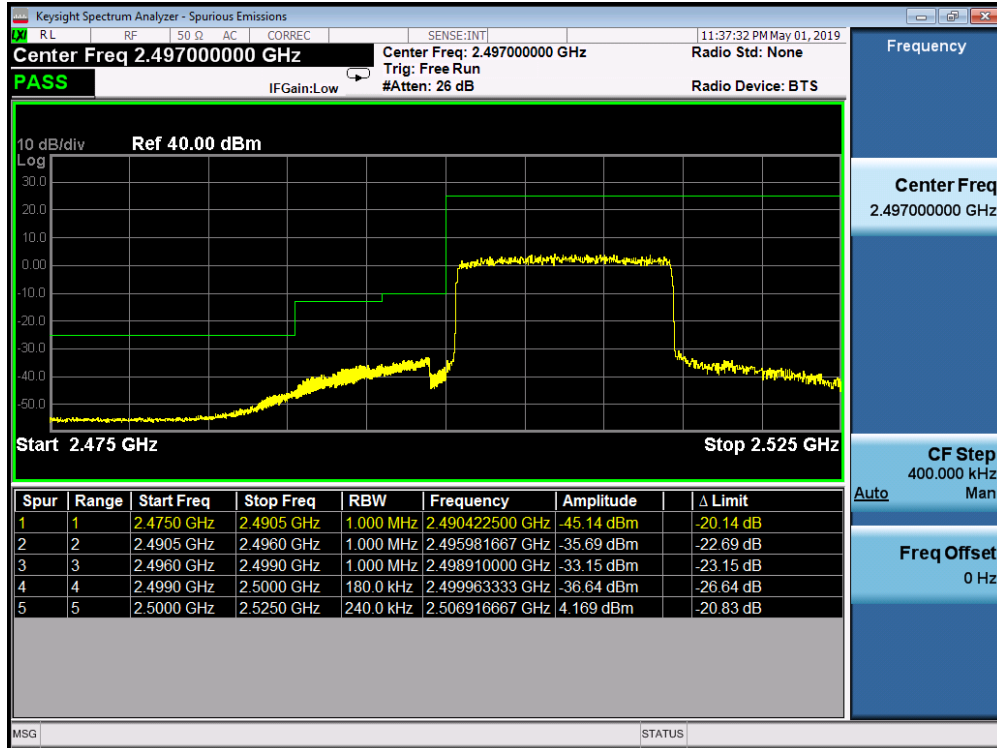


Plot 7-303. Lower ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

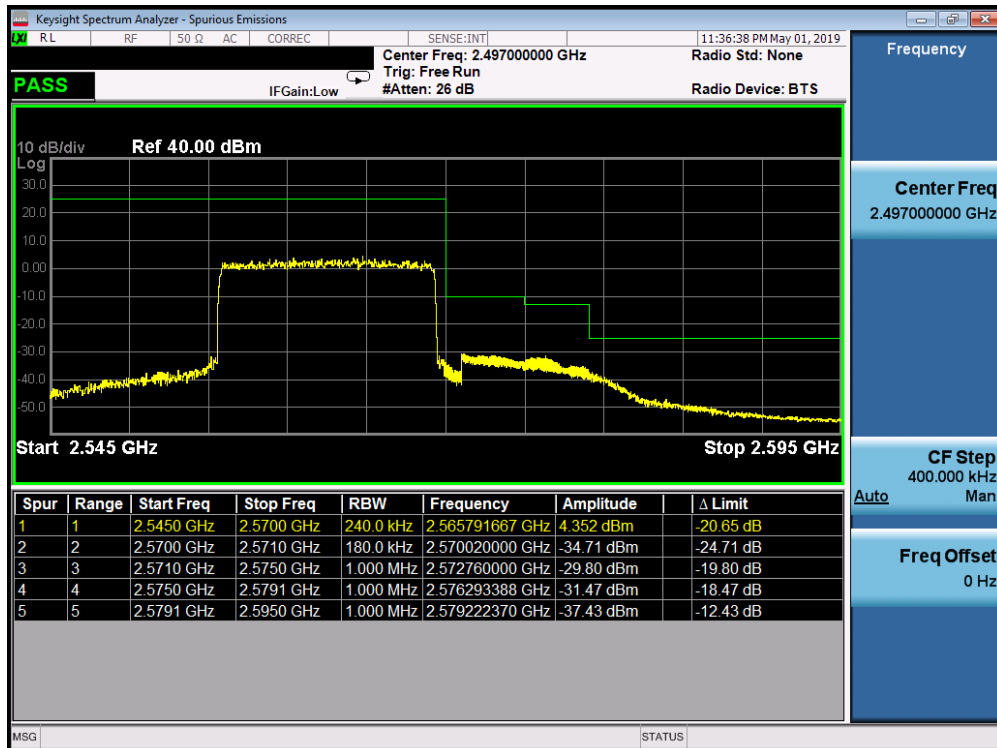


Plot 7-304. Upper ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset			Page 176 of 271

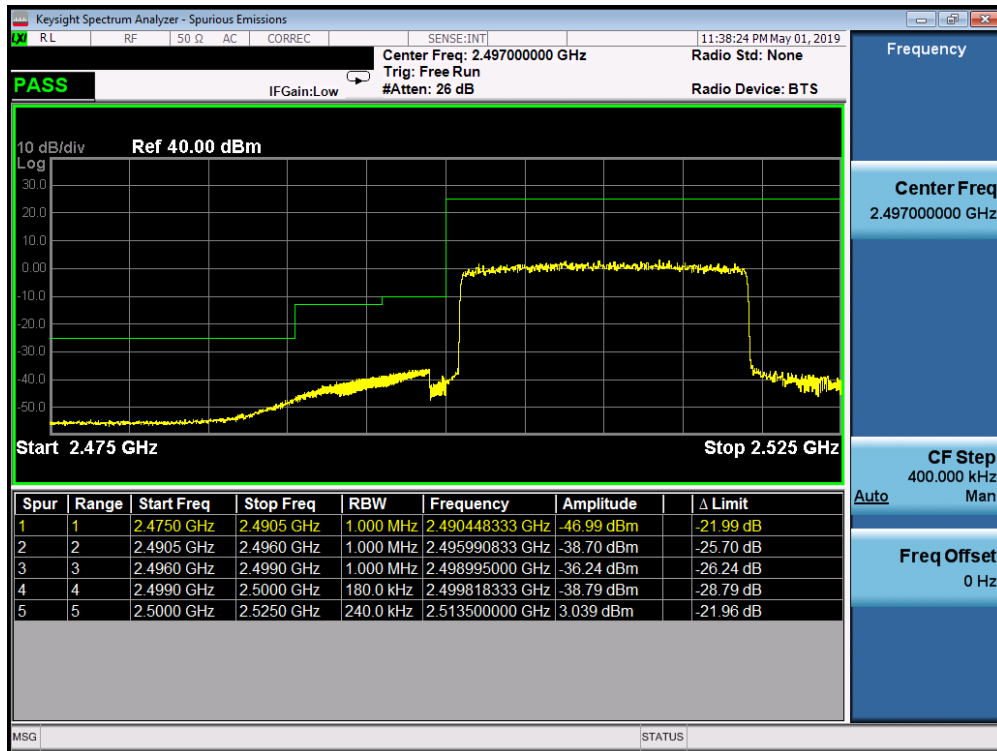


Plot 7-305. Lower ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)

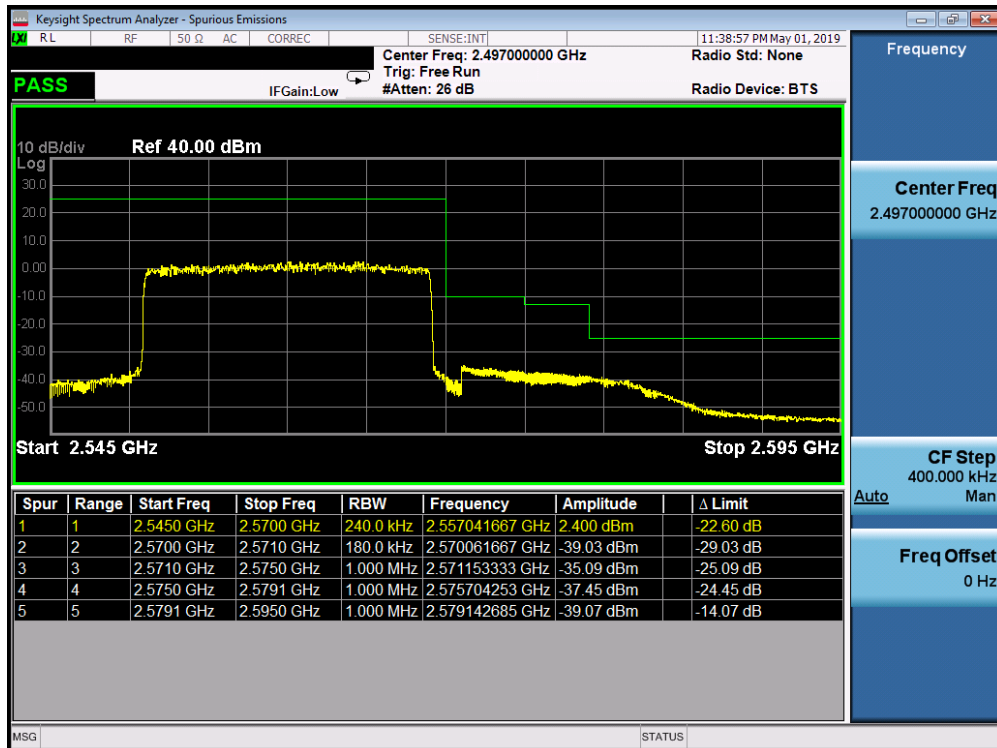


Plot 7-306. Upper ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 177 of 271

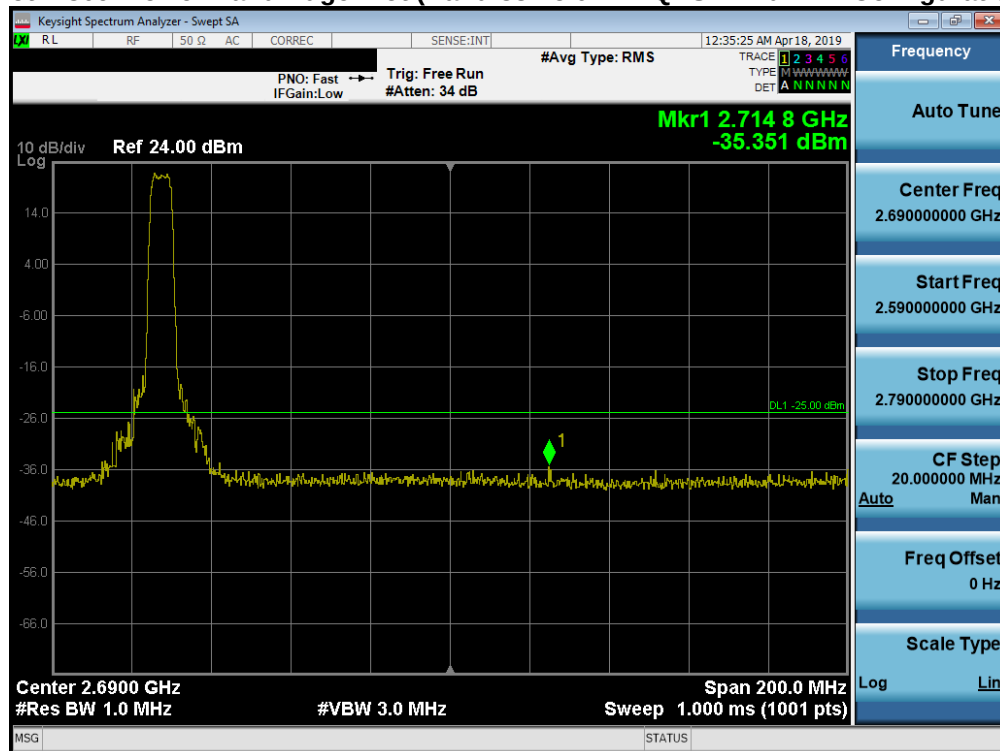
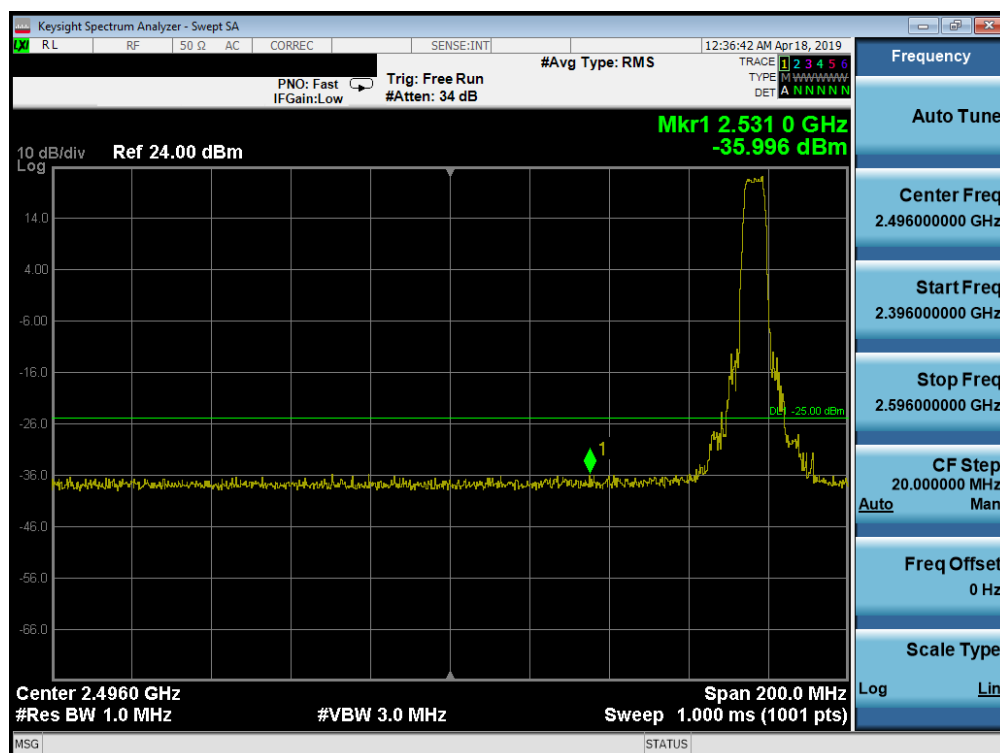


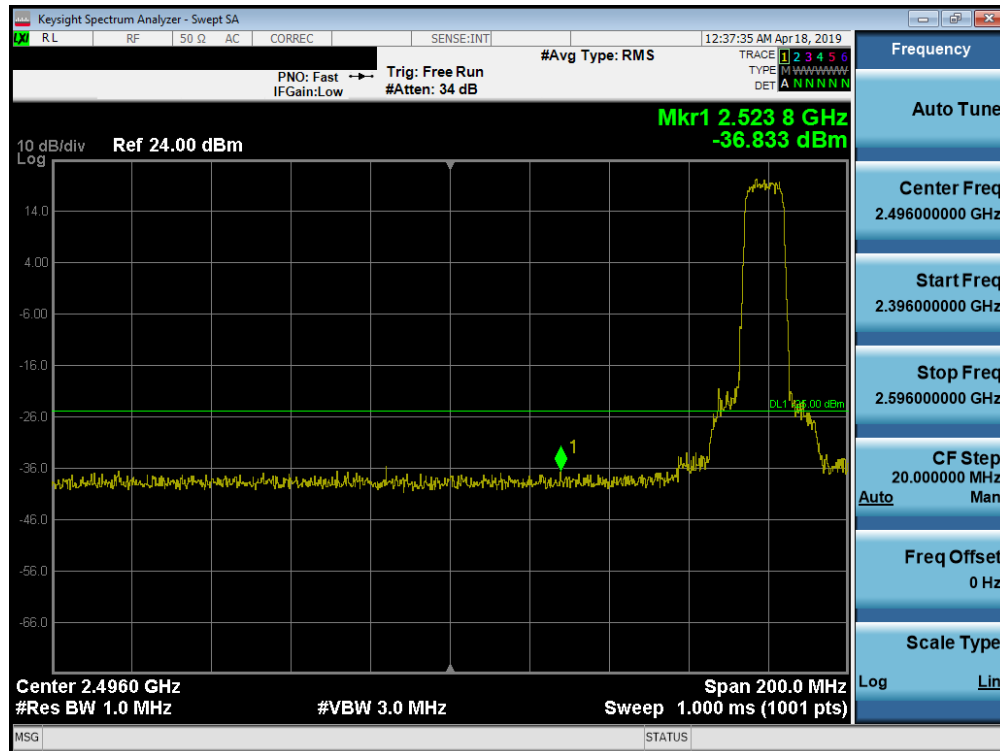
Plot 7-307. Lower ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)



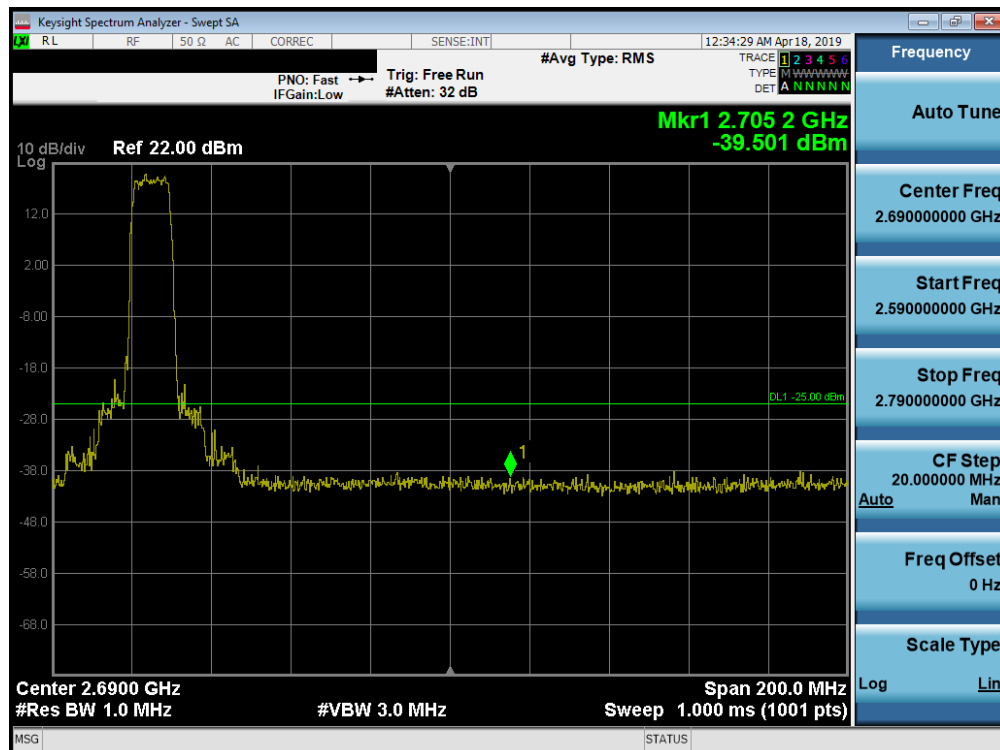
Plot 7-308. Upper ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 178 of 271



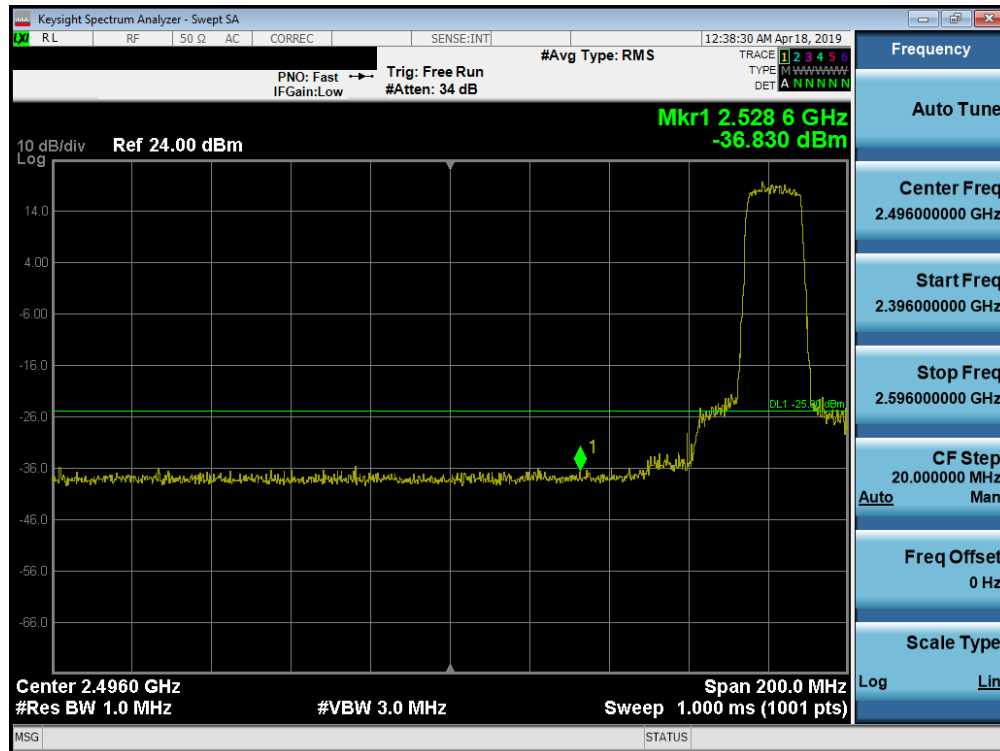


Plot 7-311. Lower Band Edge Plot (Band 38 - 10.0MHz QPSK - Full RB Configuration)

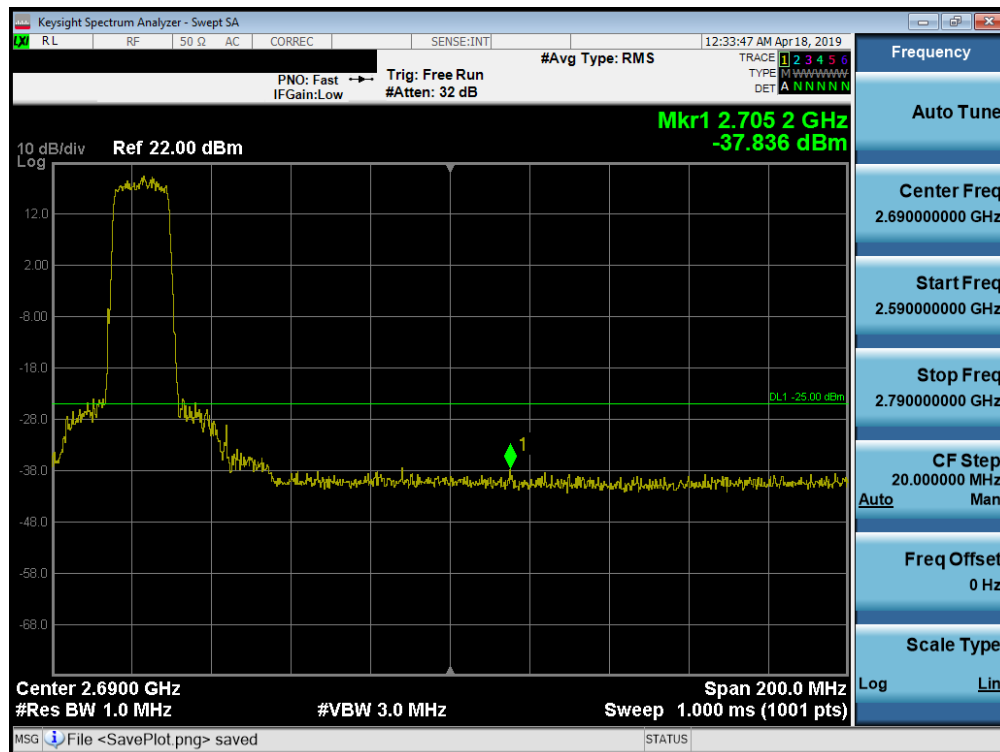


Plot 7-312. Upper Band Edge Plot (Band 38 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 180 of 271

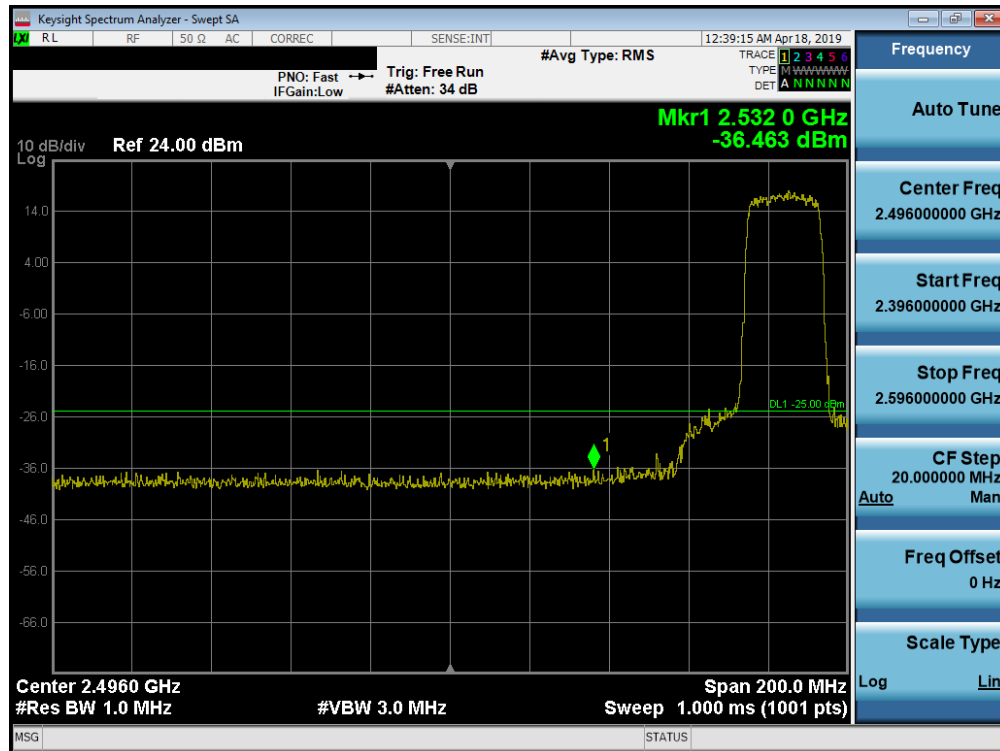


Plot 7-313. Lower Band Edge Plot (Band 38 - 15.0MHz QPSK - Full RB Configuration)

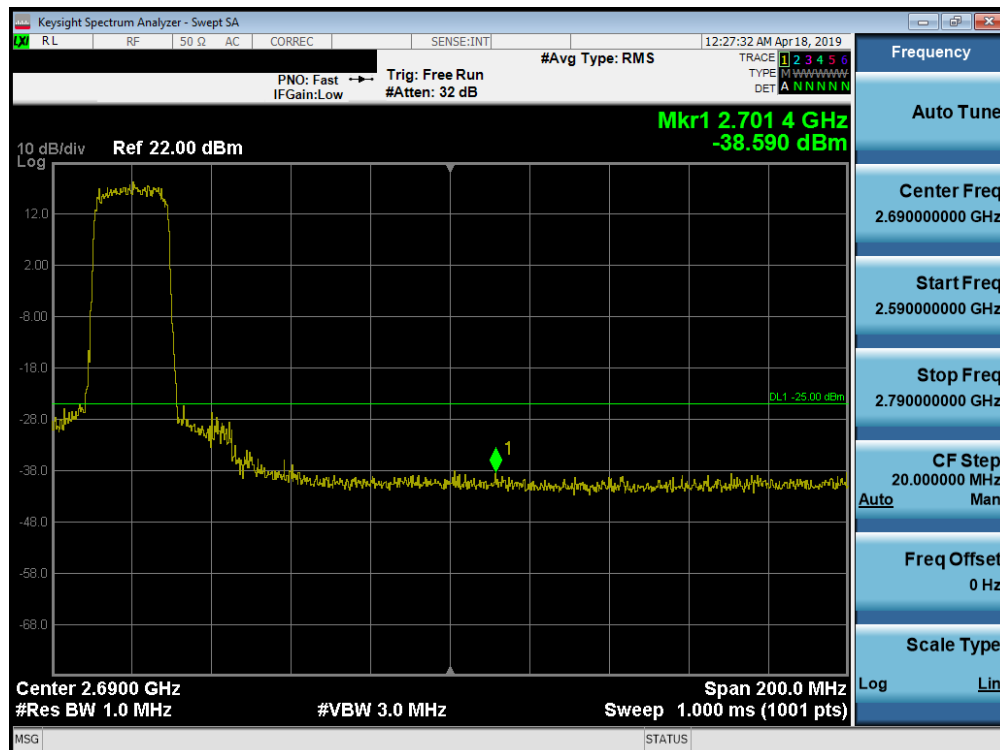


Plot 7-314. Upper Band Edge Plot (Band 38 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 181 of 271



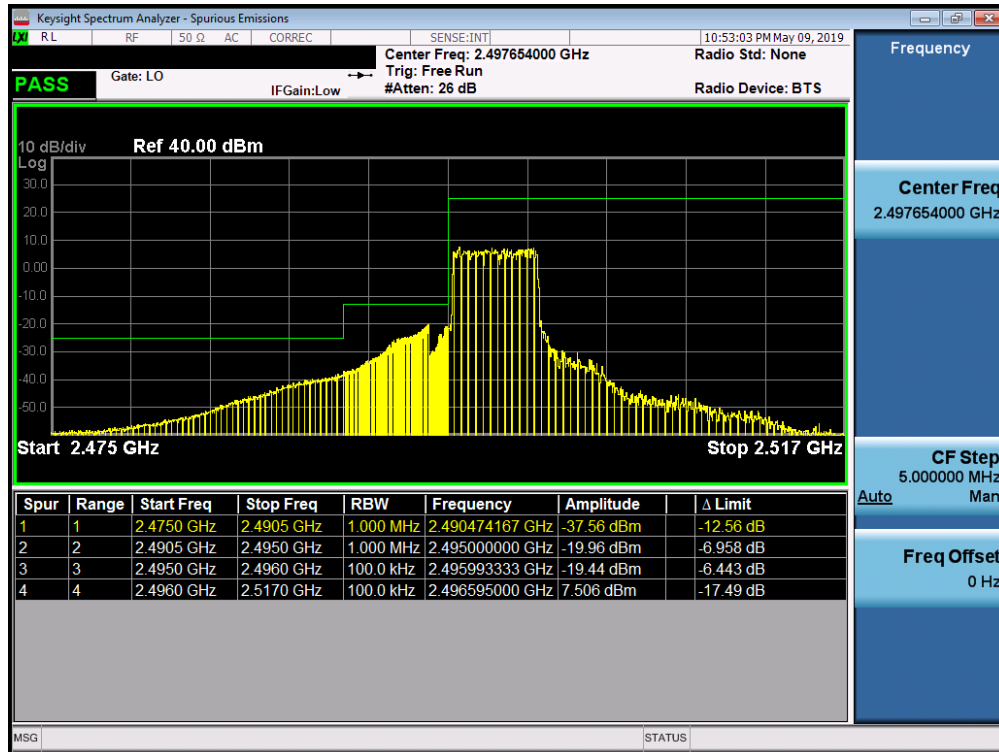
Plot 7-315. Lower Band Edge Plot (Band 38 - 20.0MHz QPSK - Full RB Configuration)



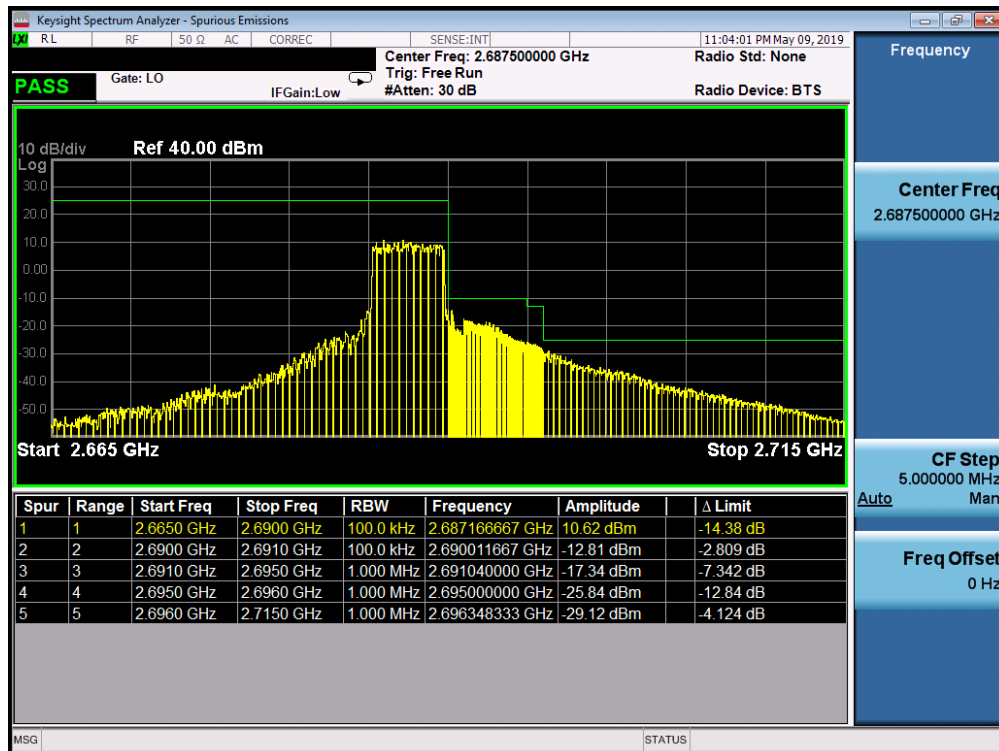
Plot 7-316. Upper Band Edge Plot (Band 38 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 182 of 271

Band 41 PC2

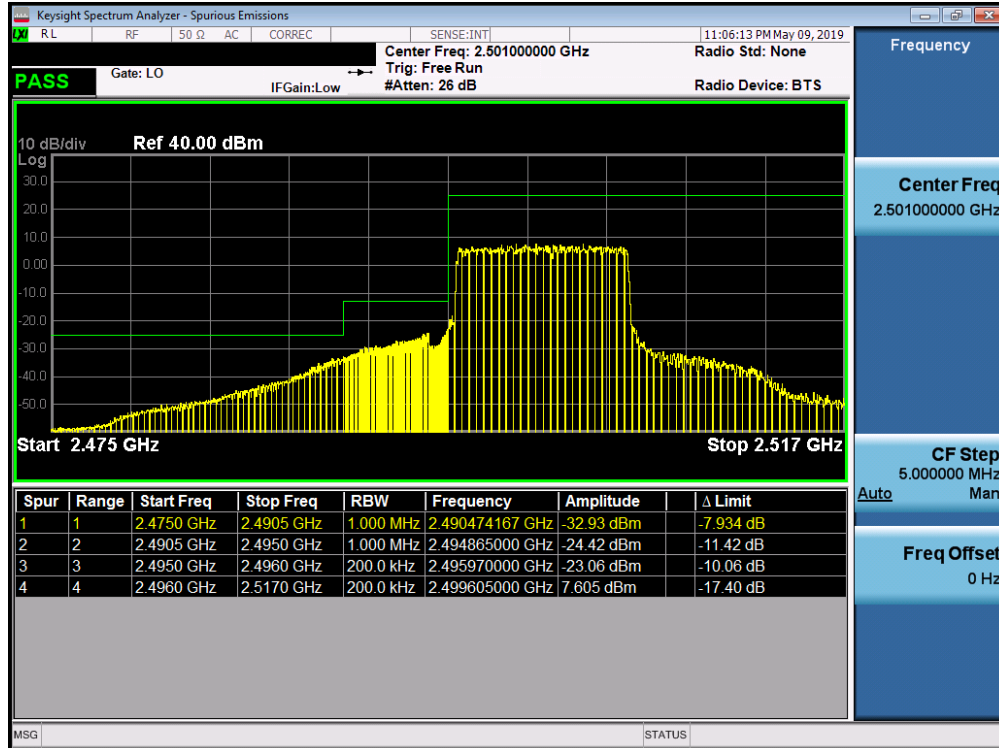


Plot 7-317. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 5.0MHz QPSK - Full RB Configuration)

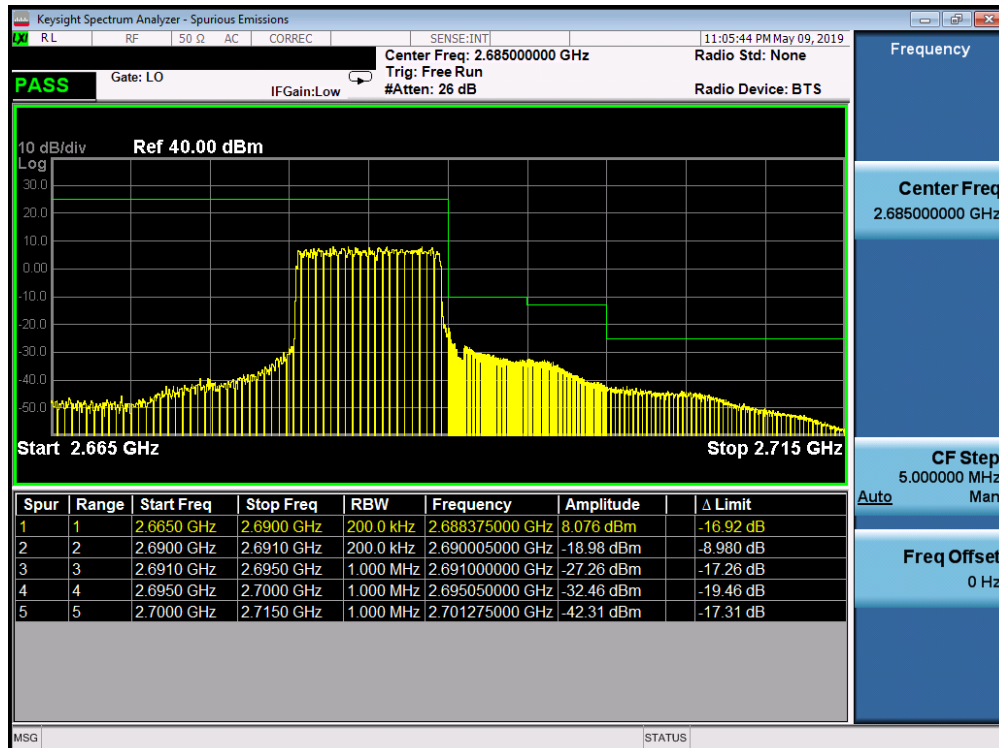


Plot 7-318. Upper ACP Plot (Band 41 PC2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset			Page 183 of 271

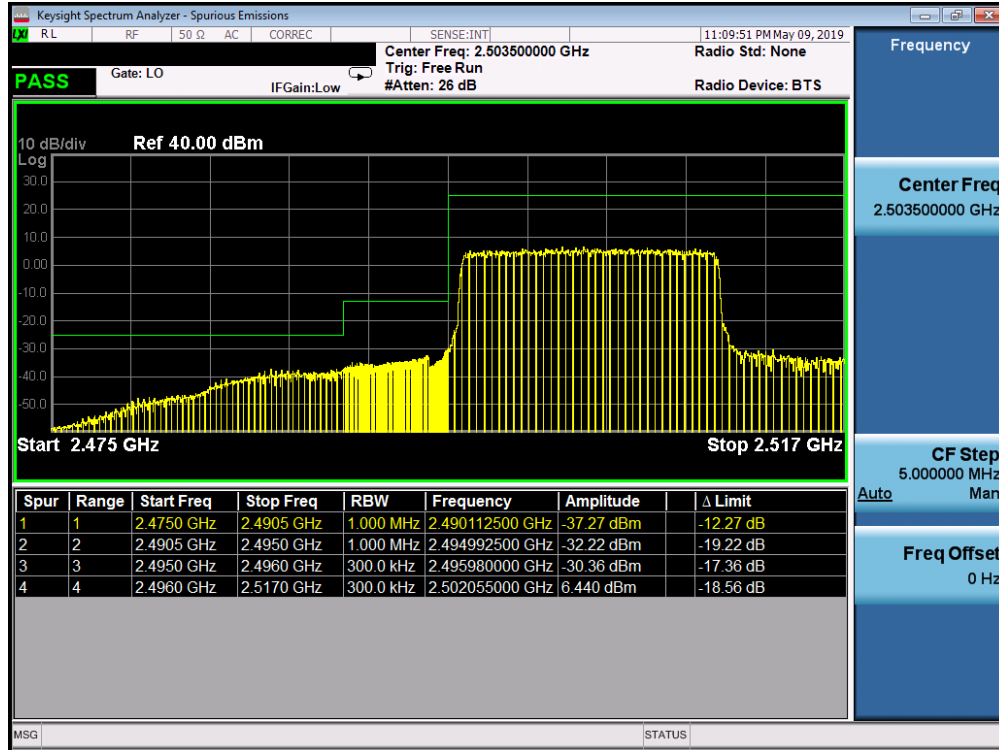


Plot 7-319. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 10.0MHz QPSK - Full RB Configuration)

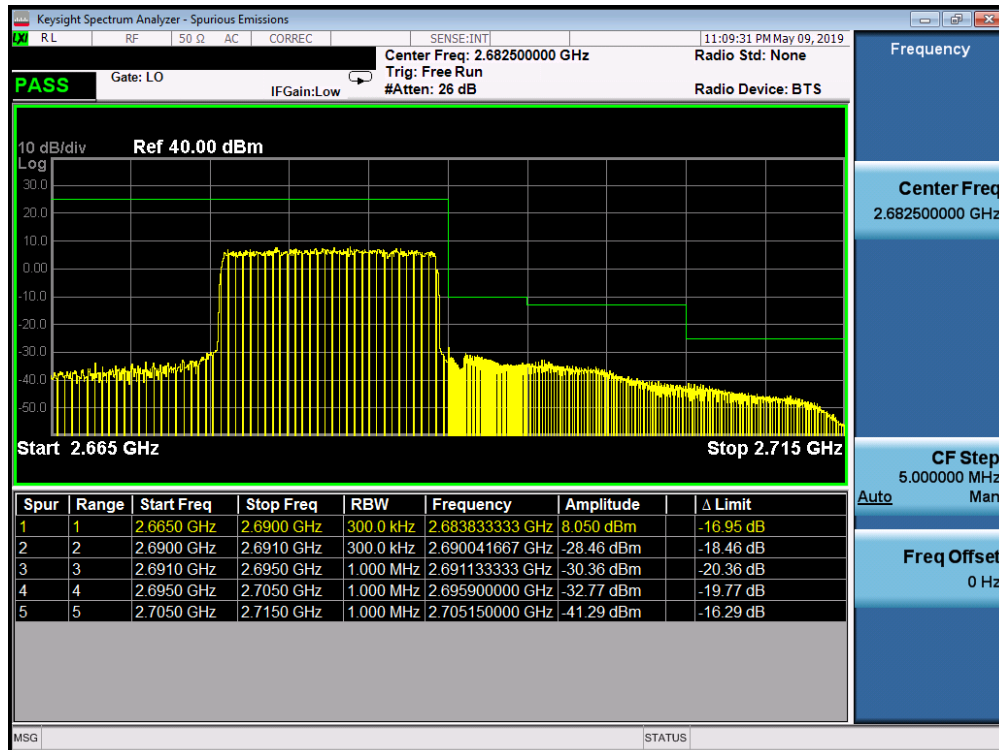


Plot 7-320. Upper ACP Plot (Band 41 PC2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 184 of 271

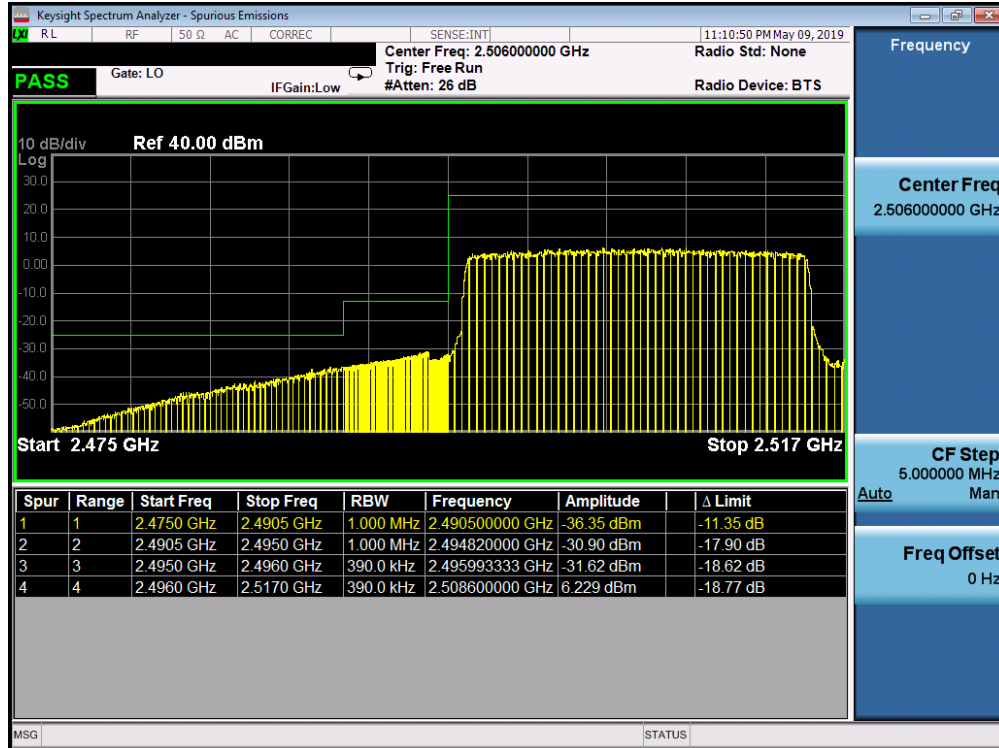


Plot 7-321. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)

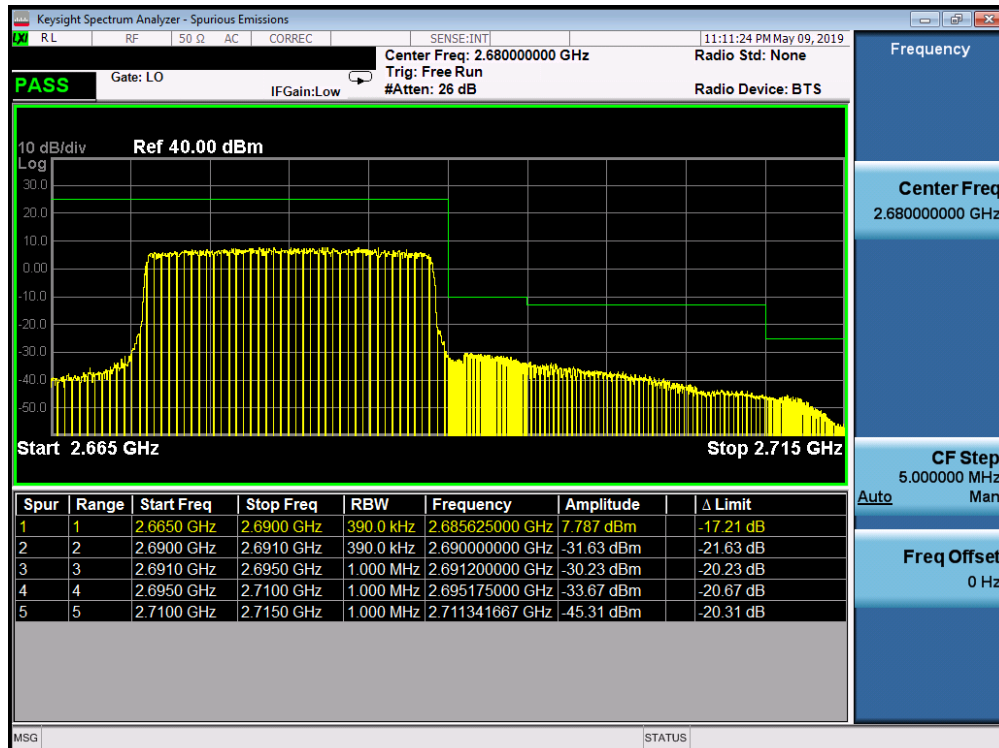


Plot 7-322. Upper ACP Plot (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 185 of 271



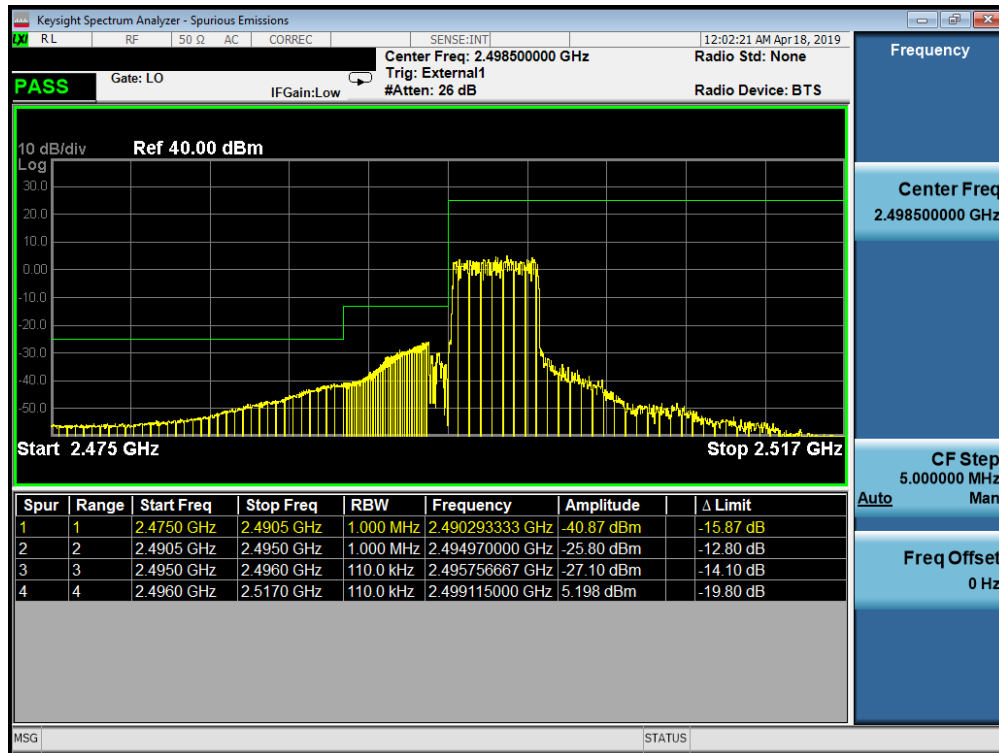
Plot 7-323. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)



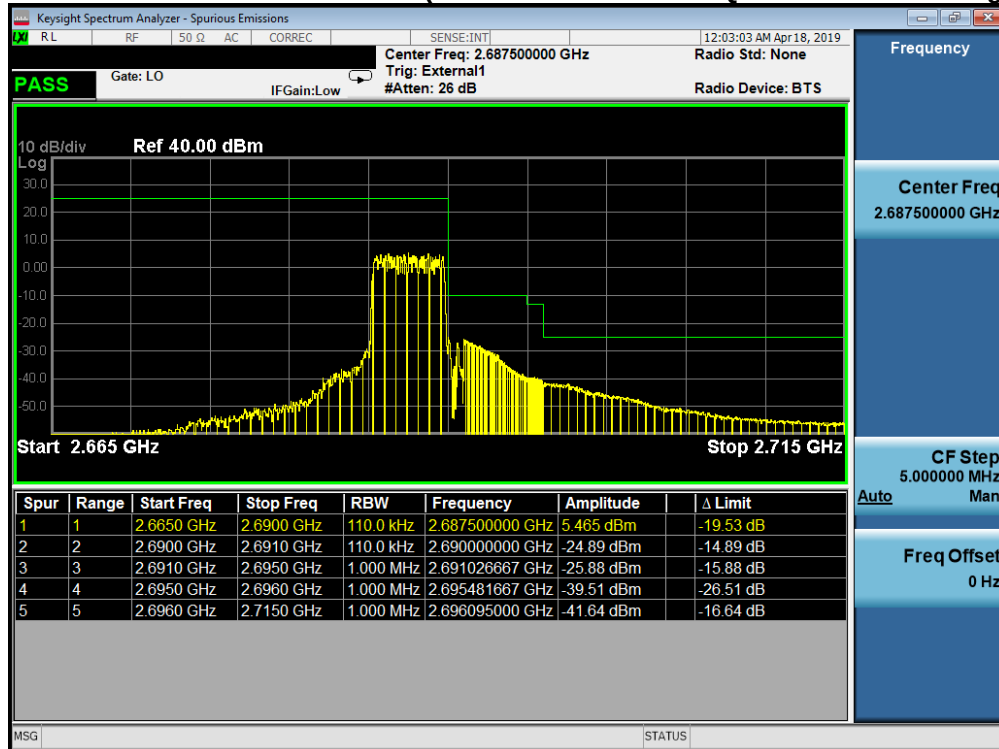
Plot 7-324. Upper ACP Plot (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 186 of 271

Band 41 PC3

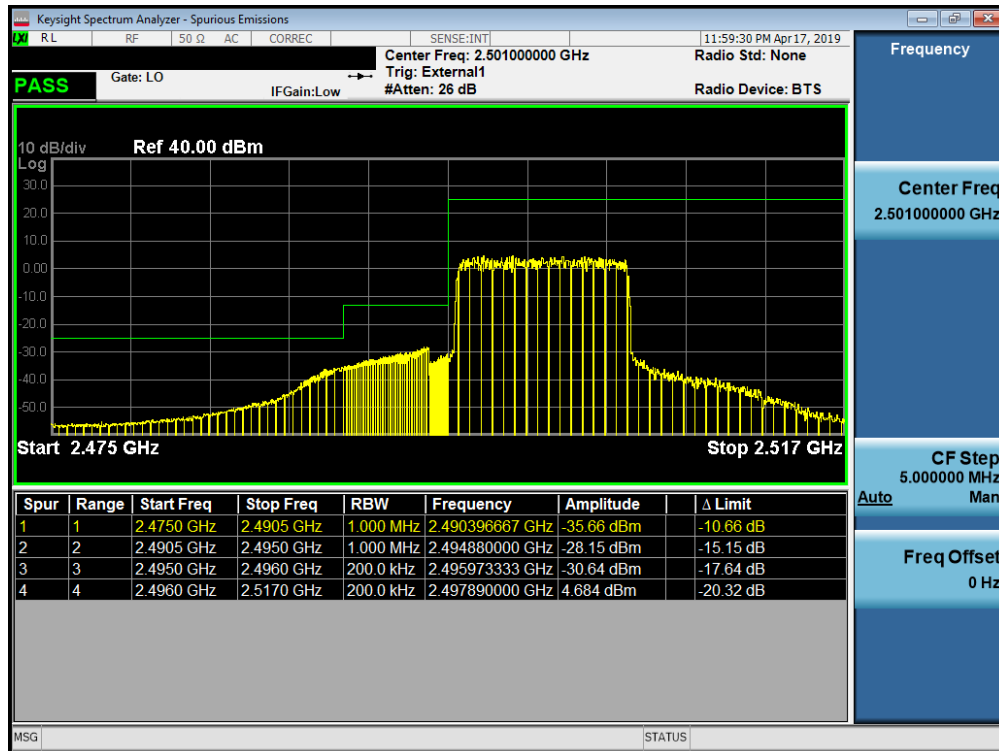


Plot 7-325. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)

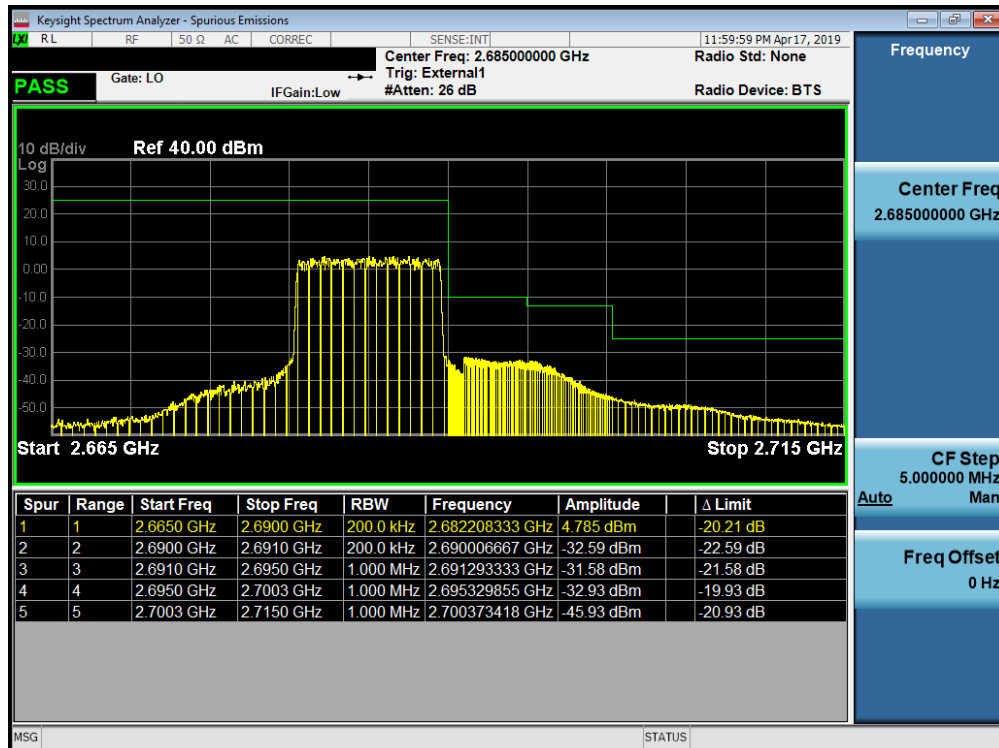


Plot 7-326. Upper ACP Plot (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 187 of 271

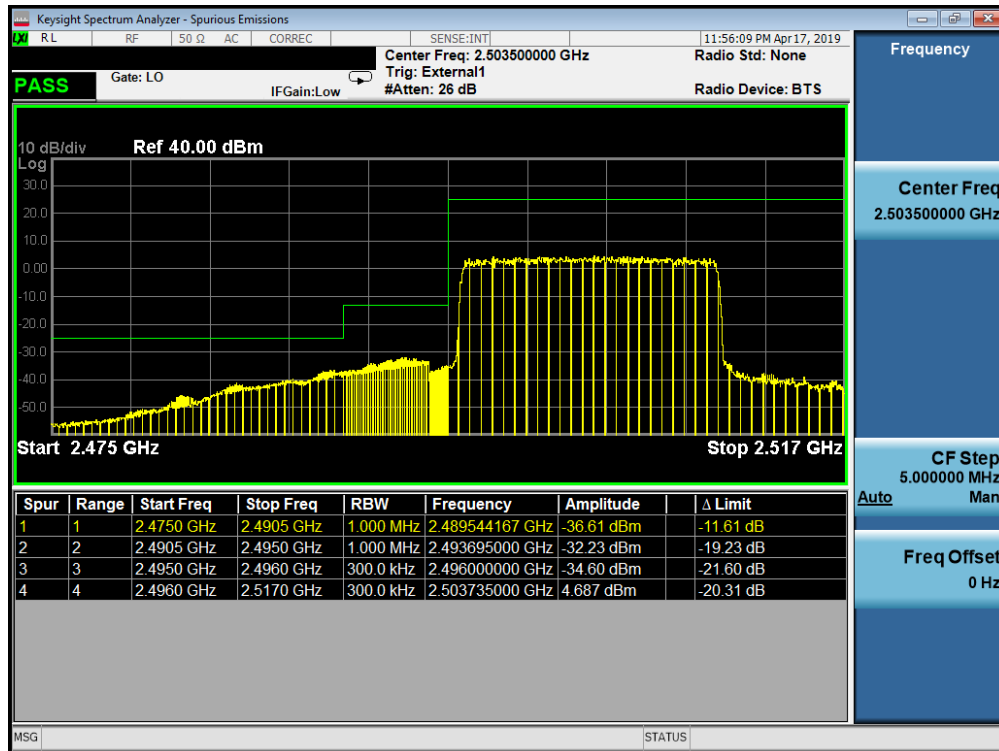


Plot 7-327. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 10.0MHz QPSK - Full RB Configuration)

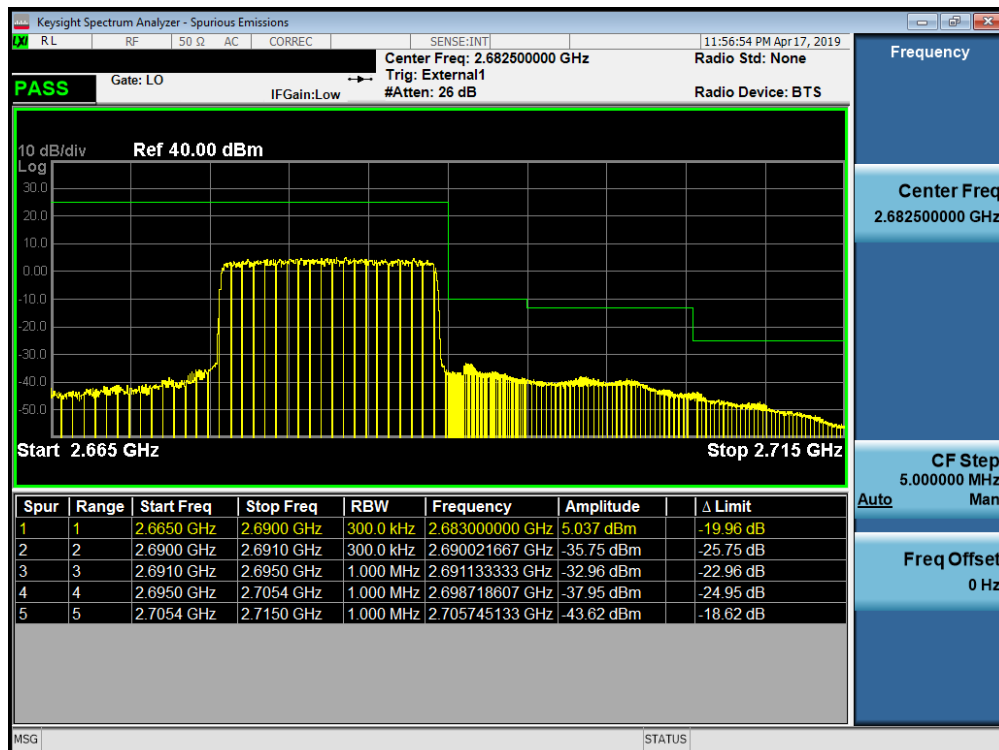


Plot 7-328. Upper ACP Plot (Band 41 PC3 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 188 of 271

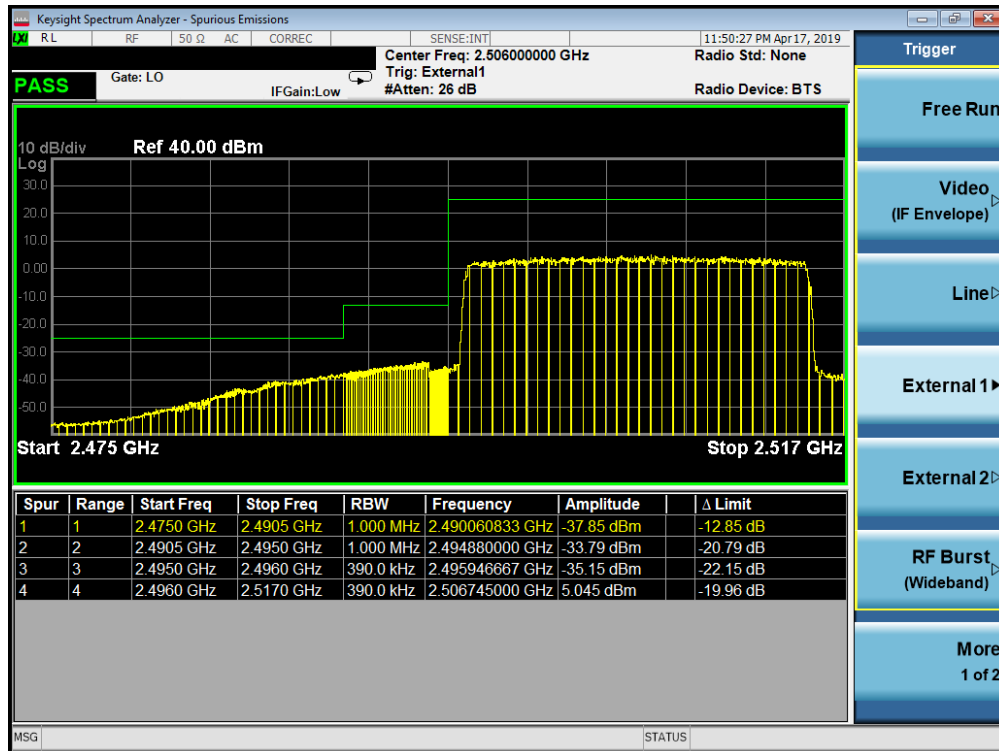


Plot 7-329. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)

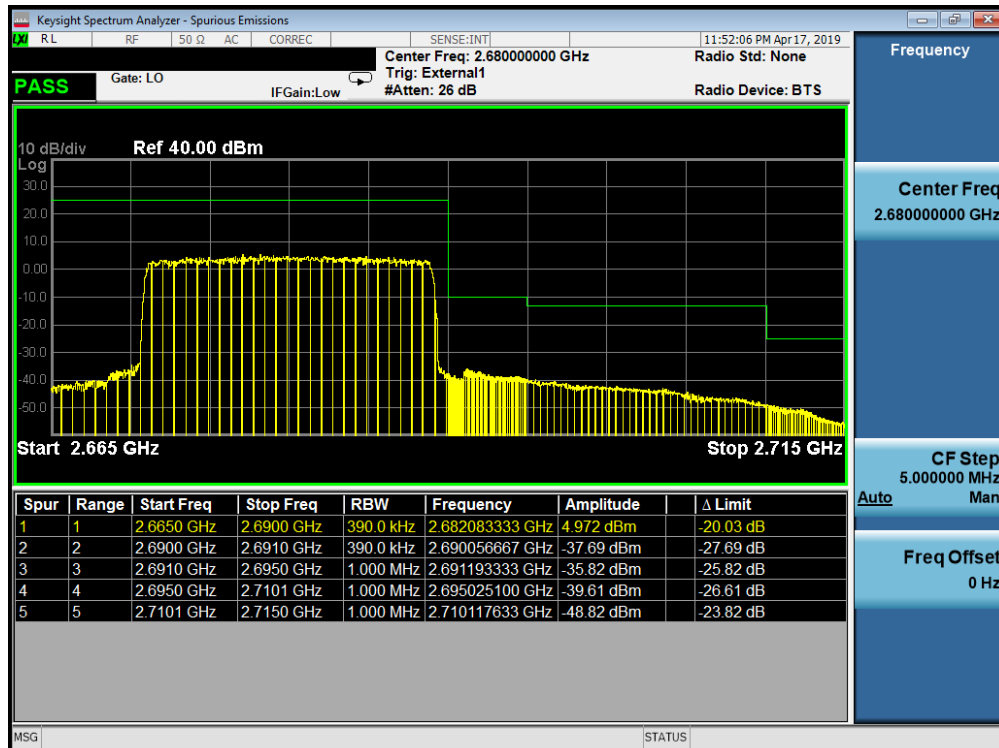


Plot 7-330. Upper ACP Plot (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-331. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-332. Upper ACP Plot (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 190 of 271		

7.5 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW $\geq$ OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

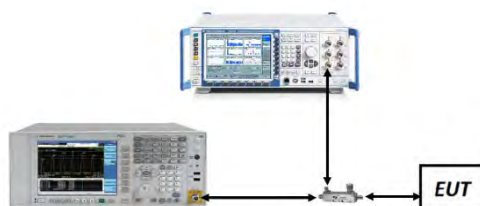


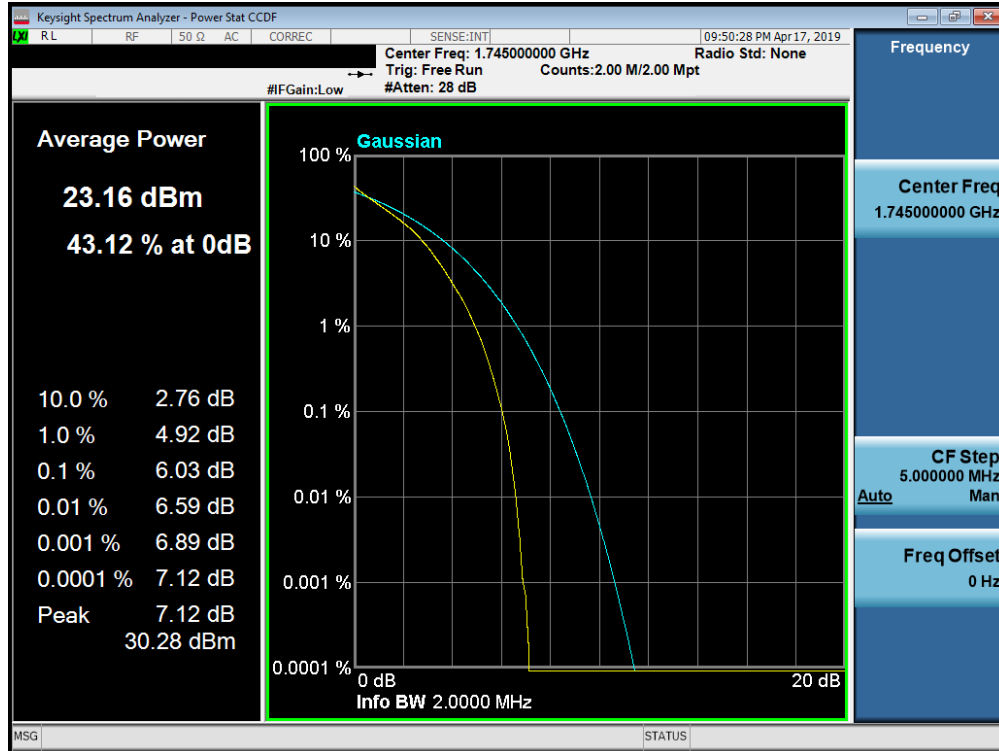
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

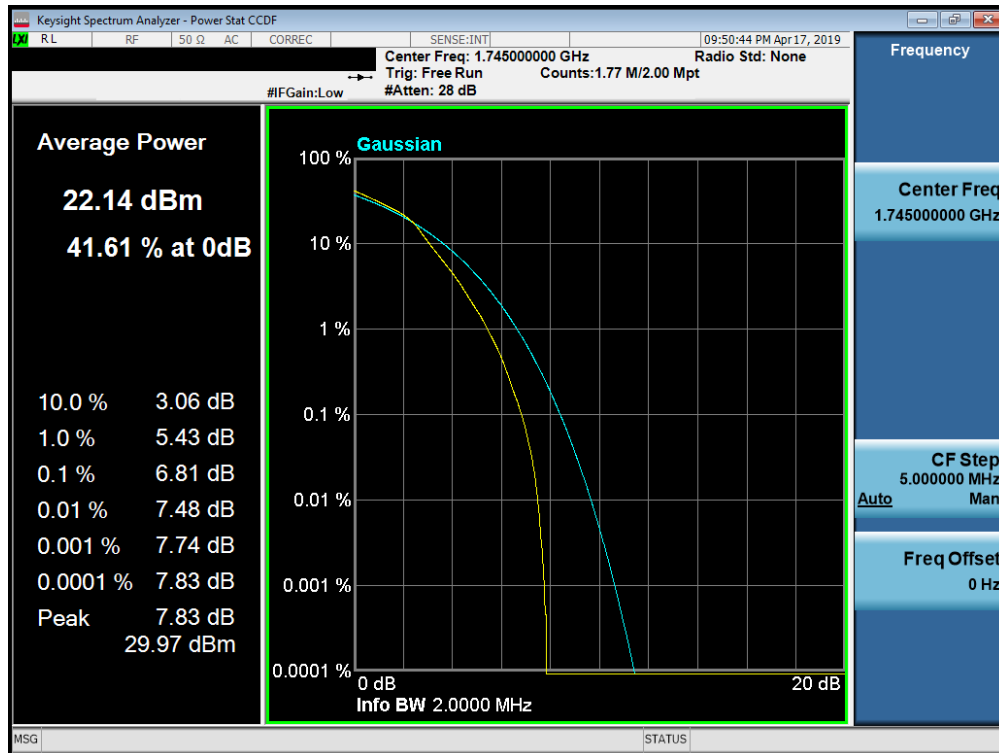
None.

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 191 of 271

Band 66/4

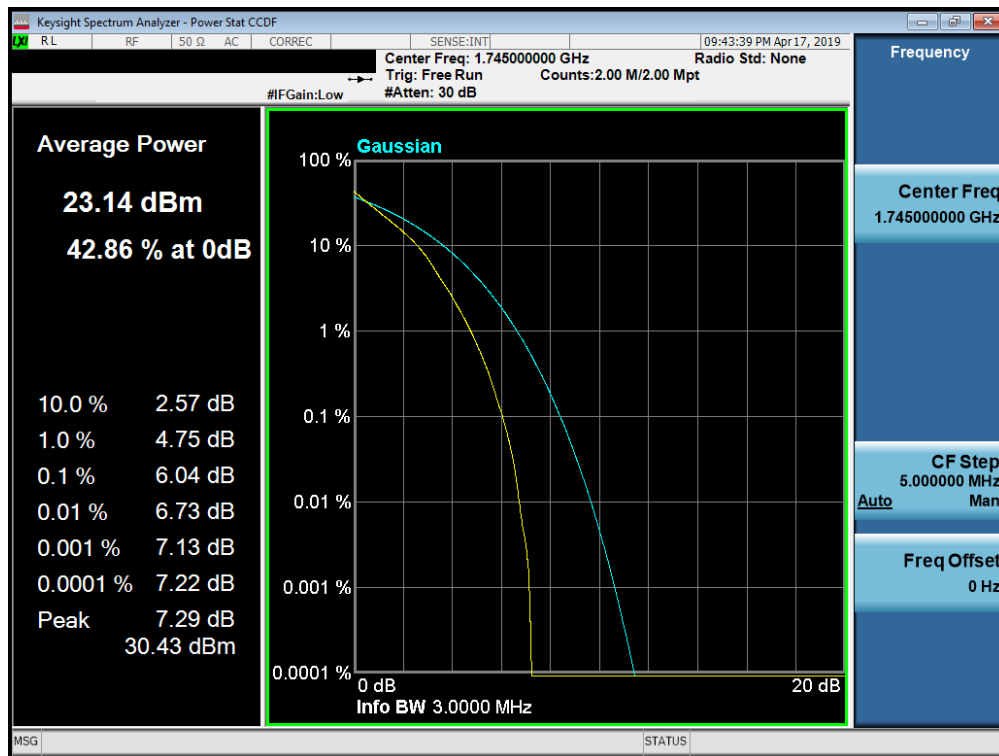
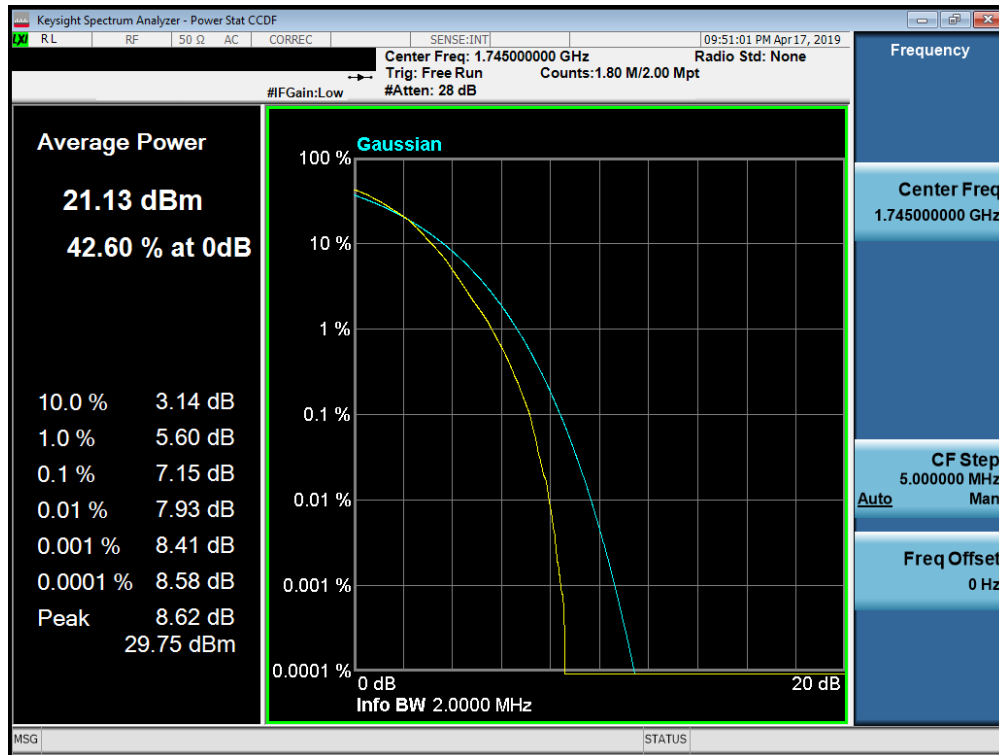


Plot 7-333. PAR Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

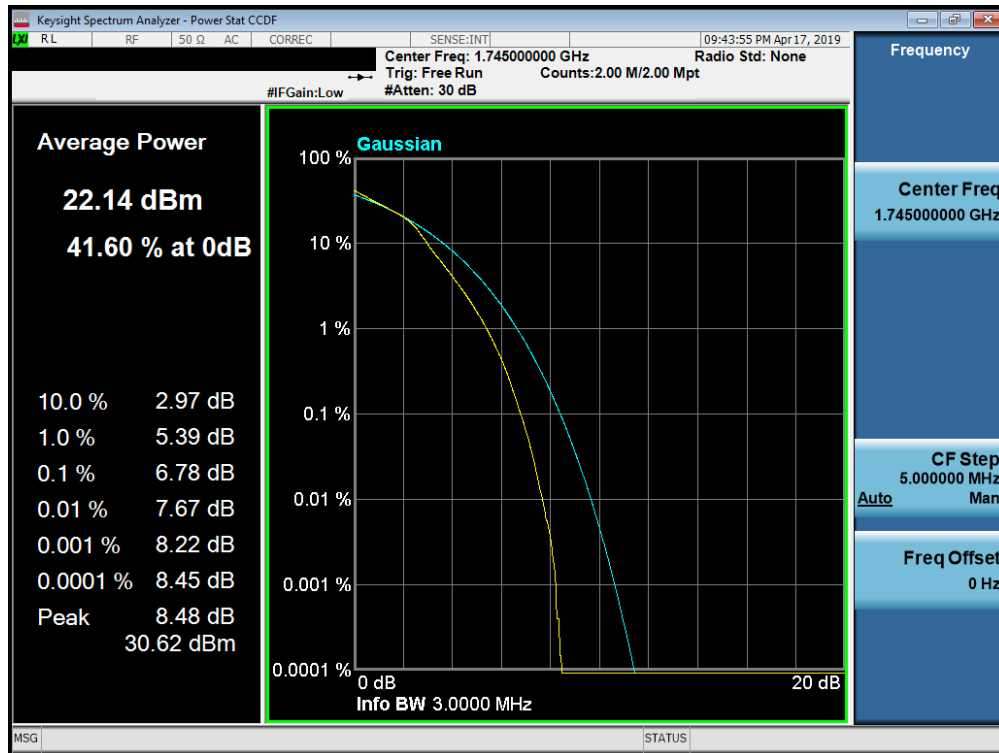


Plot 7-334. PAR Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

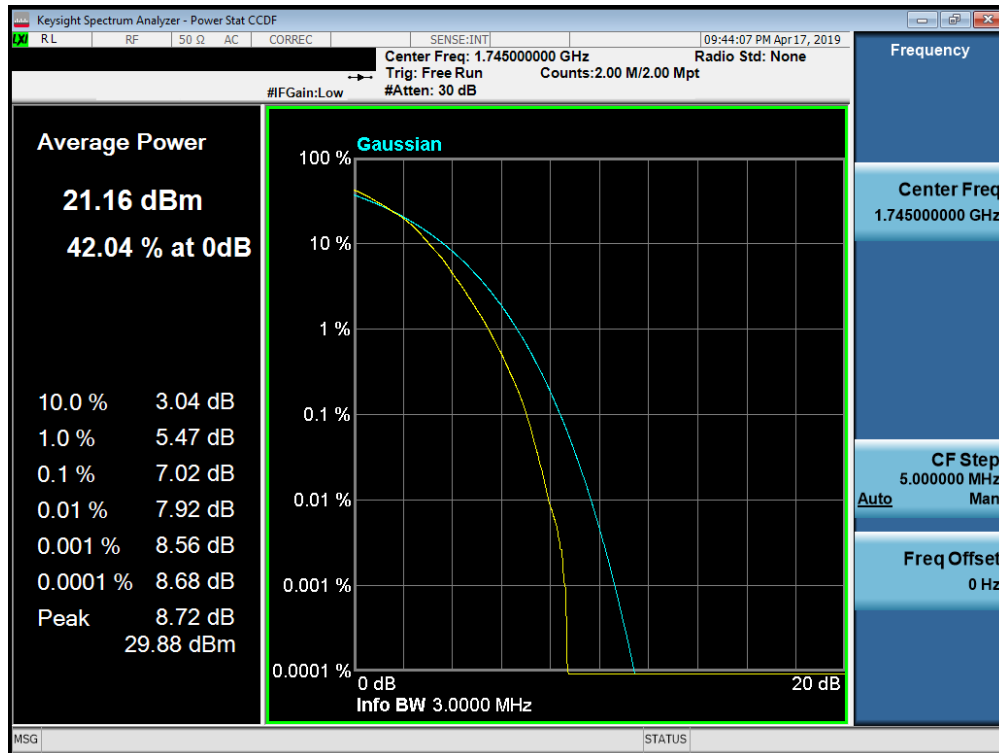
FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 192 of 271



FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 193 of 271

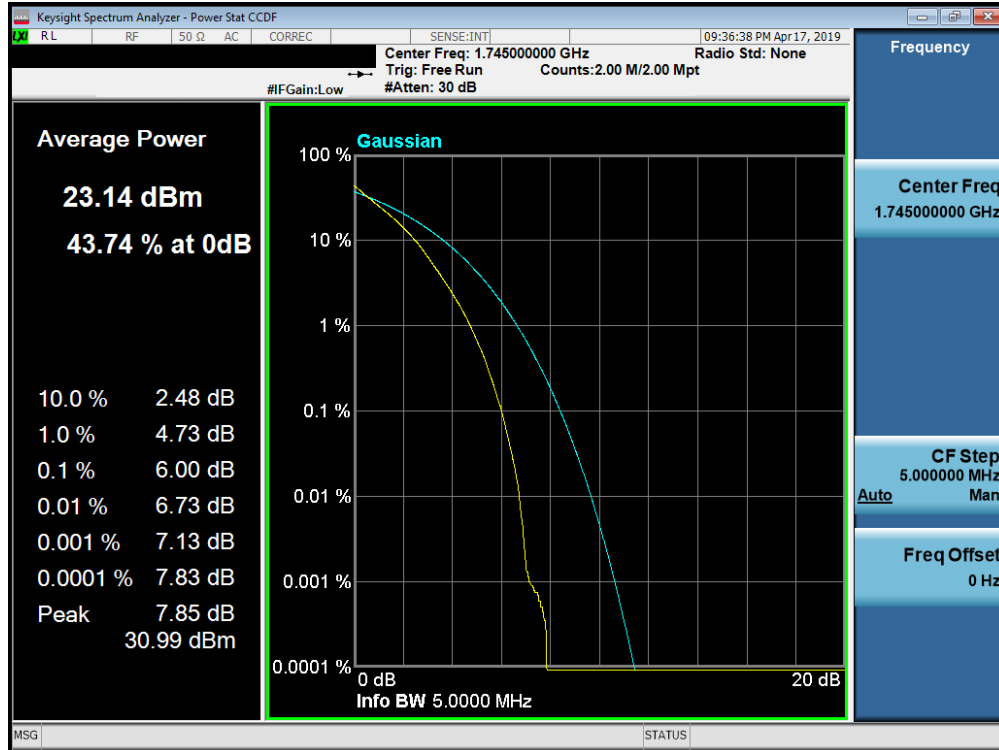


Plot 7-337. PAR Plot (Band 66/4 – 3.0MHz 16-QAM - Full RB Configuration)

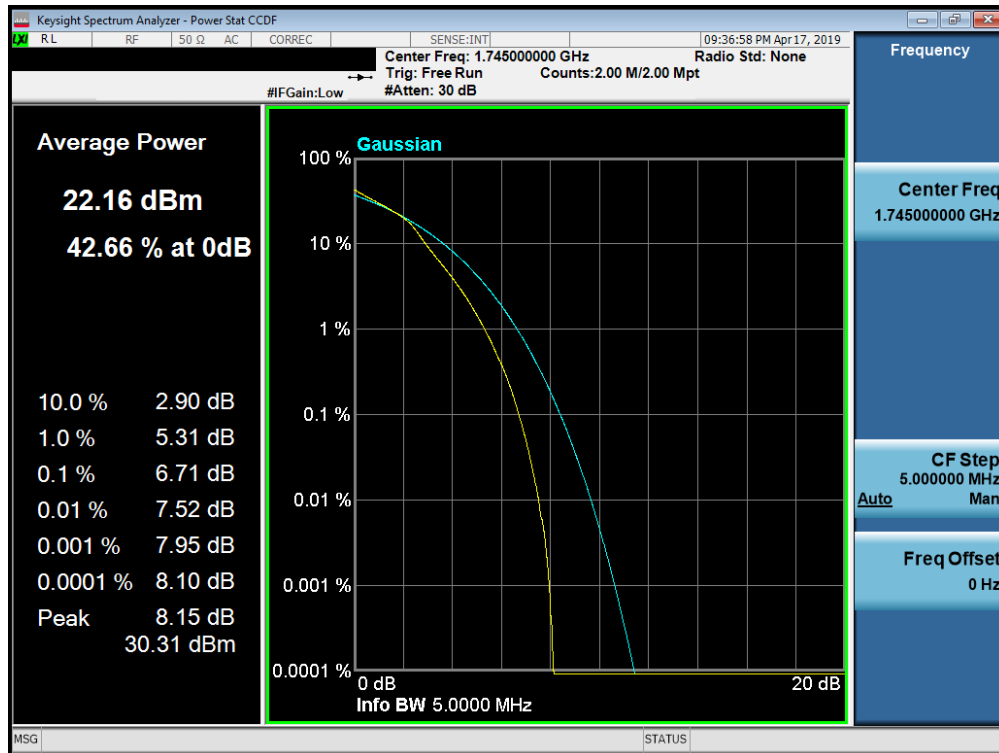


Plot 7-338. PAR Plot (Band 66/4 – 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 194 of 271

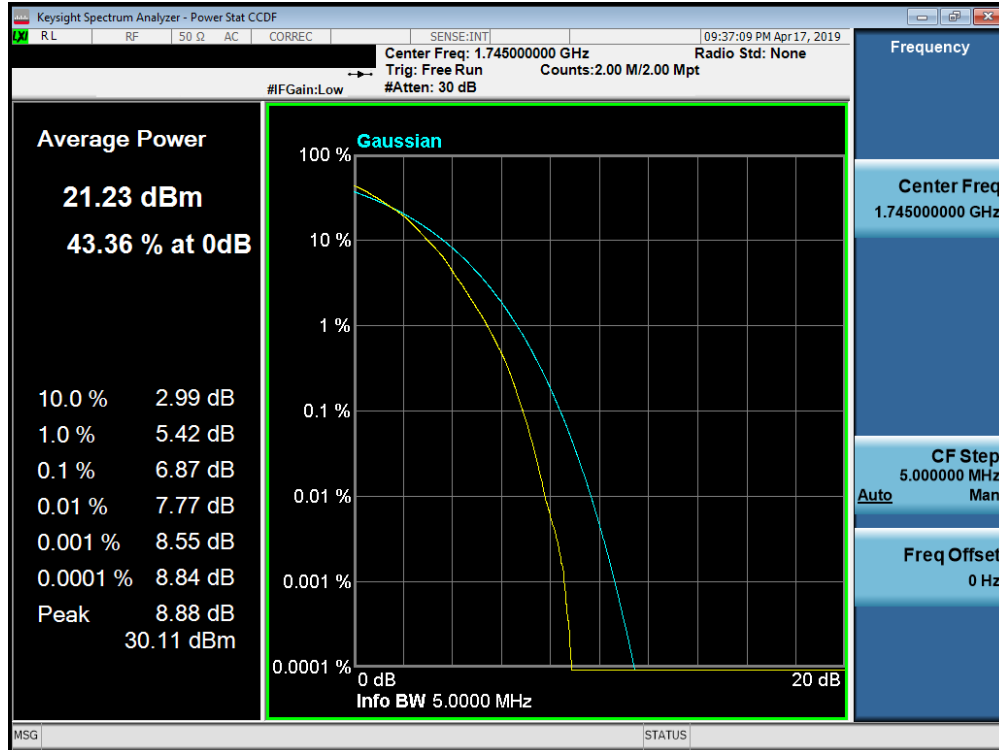


Plot 7-339. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

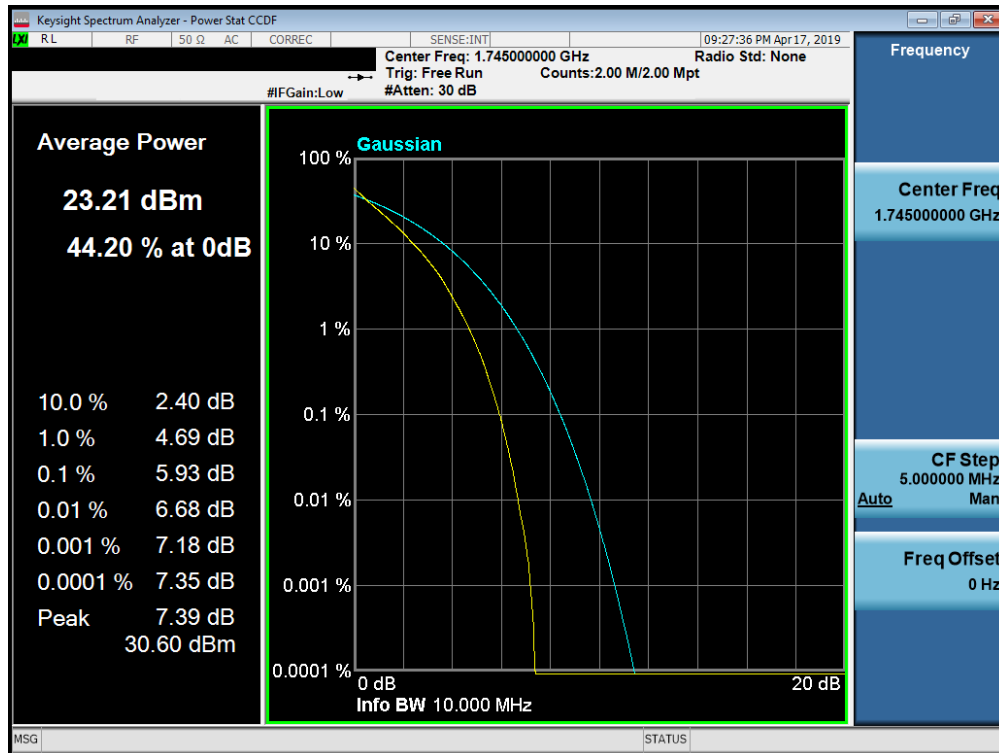


Plot 7-340. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 195 of 271

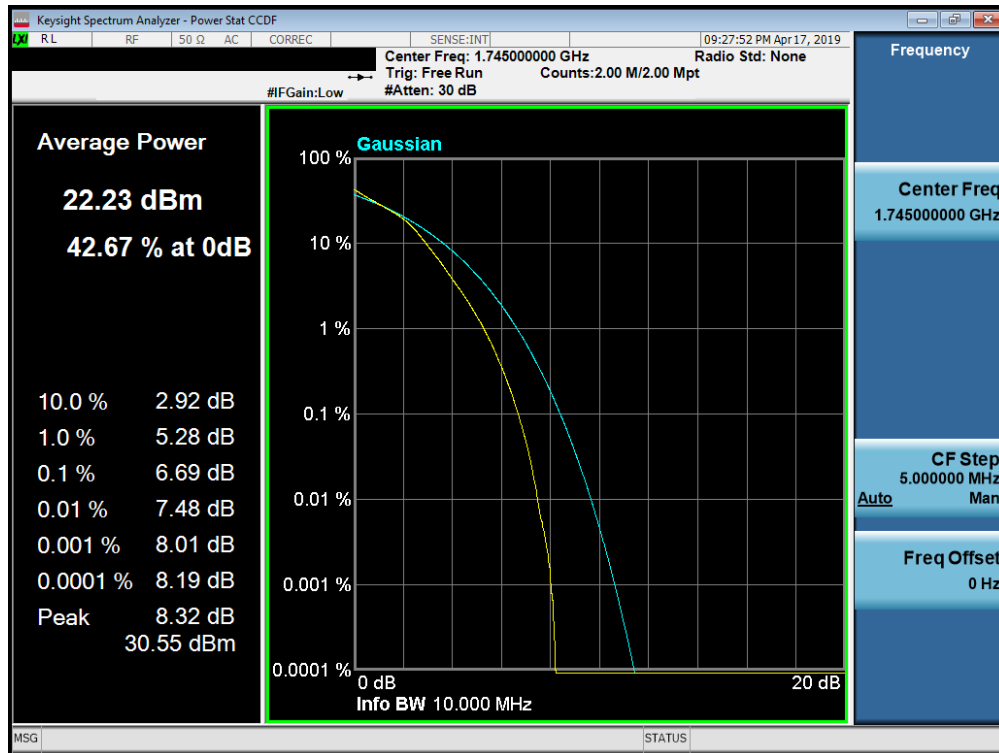


Plot 7-341. PAR Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)

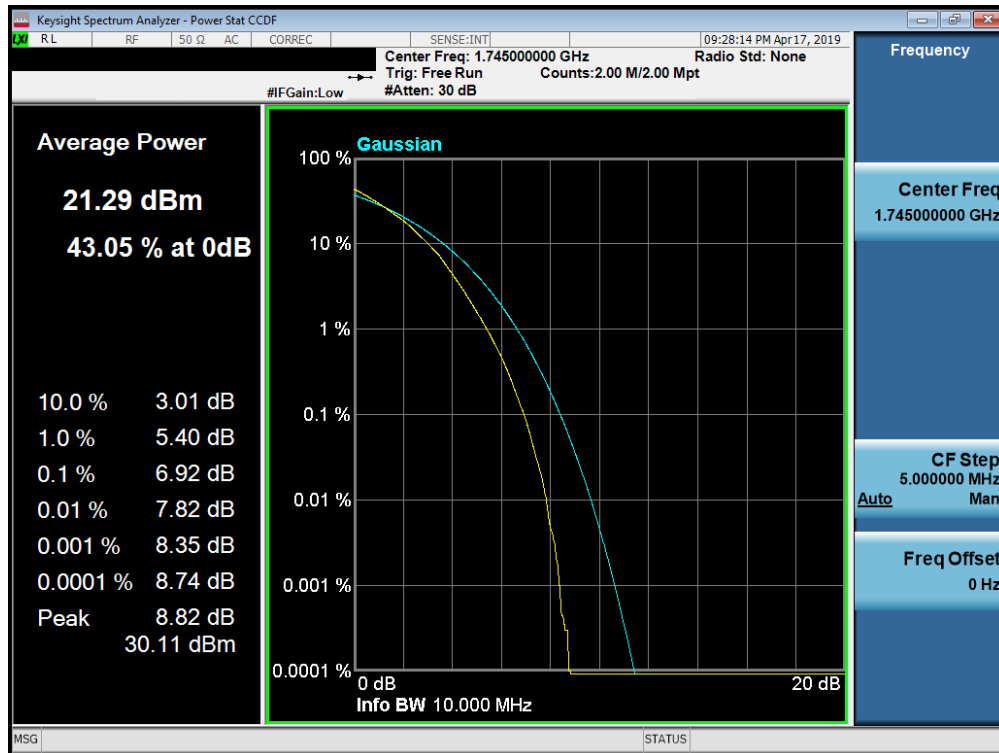


Plot 7-342. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 196 of 271

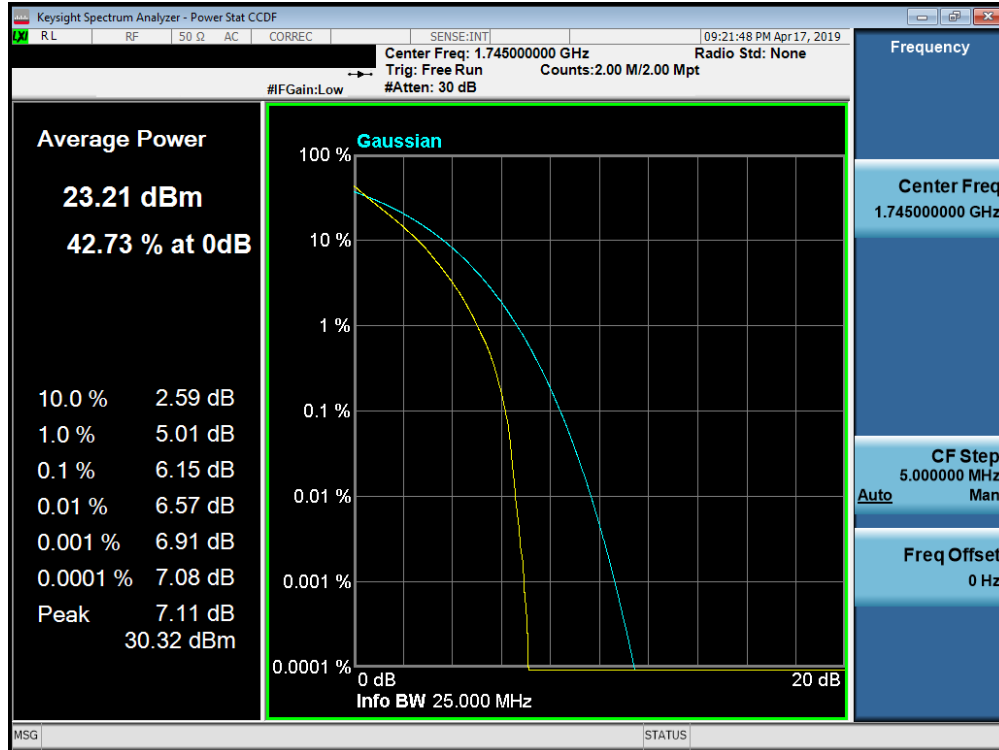


Plot 7-343. PAR Plot (Band 66/4 – 10.0MHz 16-QAM - Full RB Configuration)

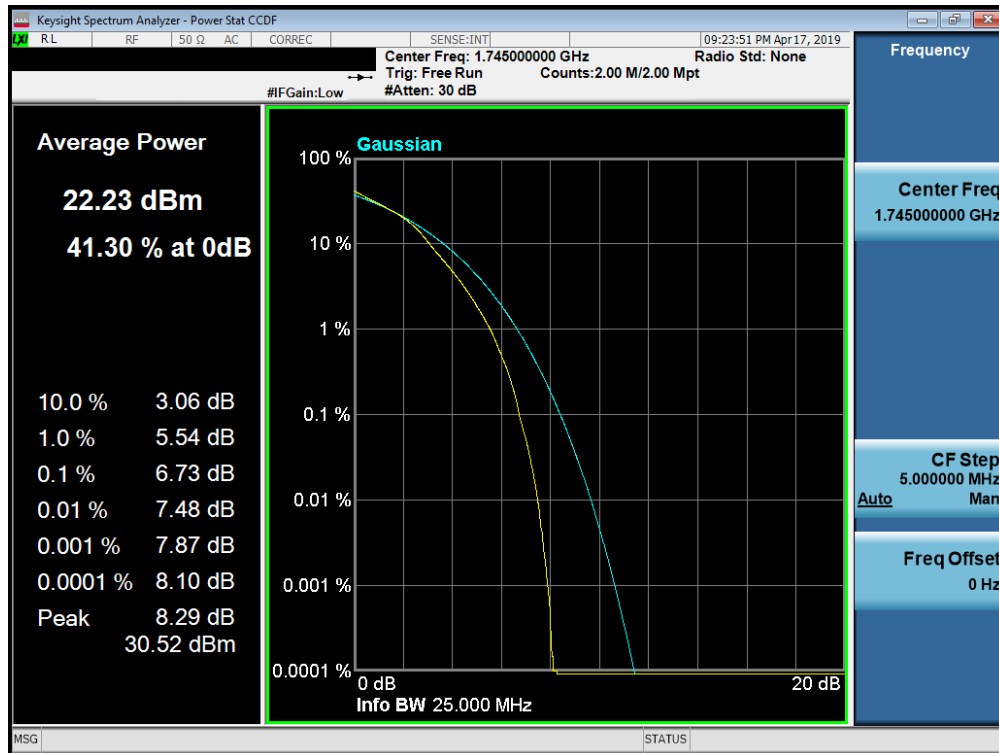


Plot 7-344. PAR Plot (Band 66/4 – 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 197 of 271

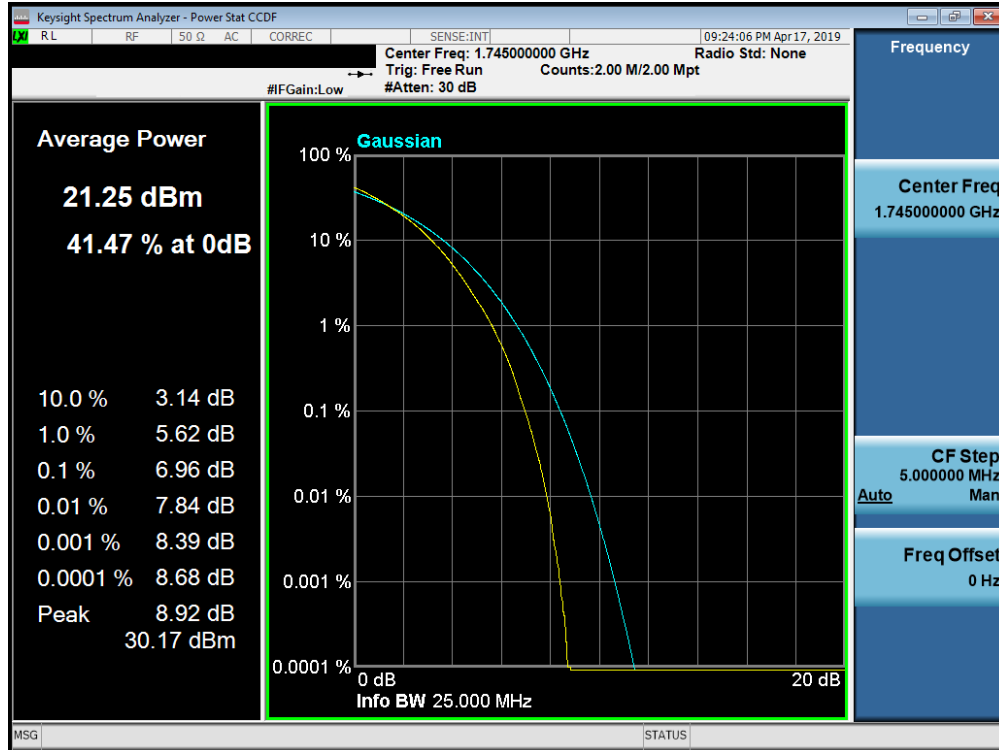


Plot 7-345. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

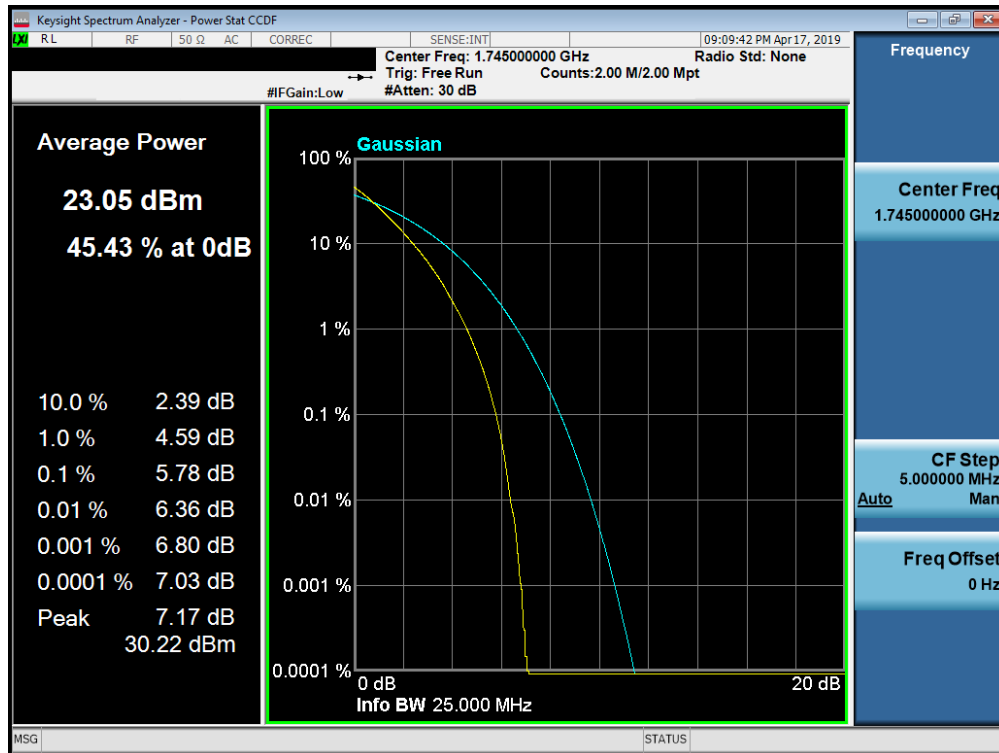


Plot 7-346. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 198 of 271

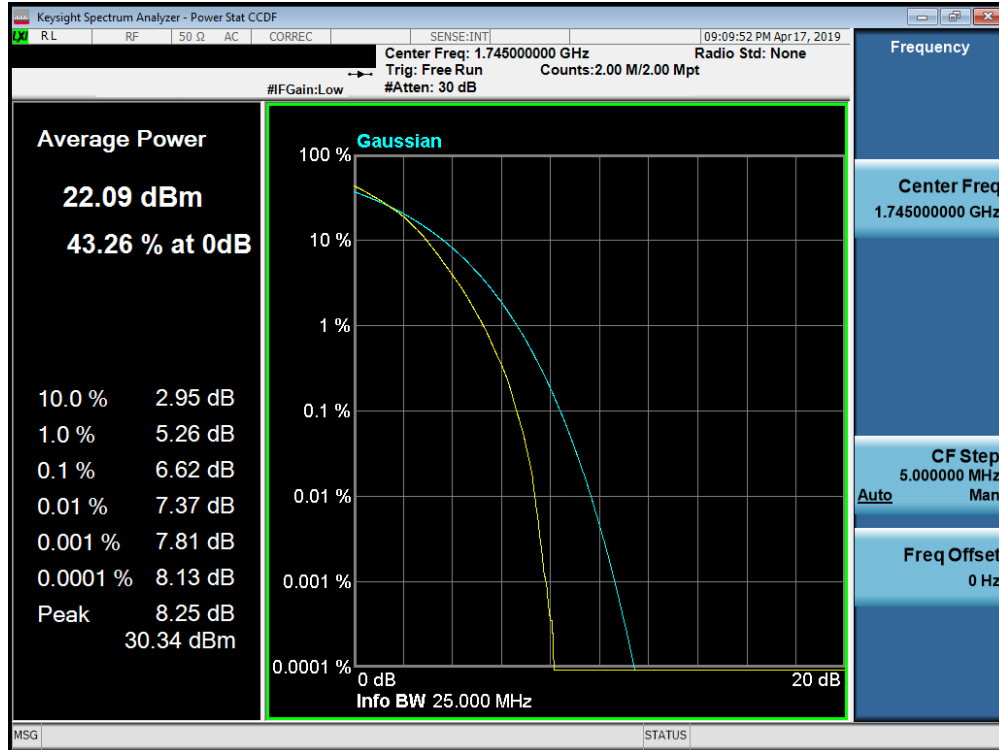


Plot 7-347. PAR Plot (Band 66/4 – 15.0MHz 64-QAM - Full RB Configuration)

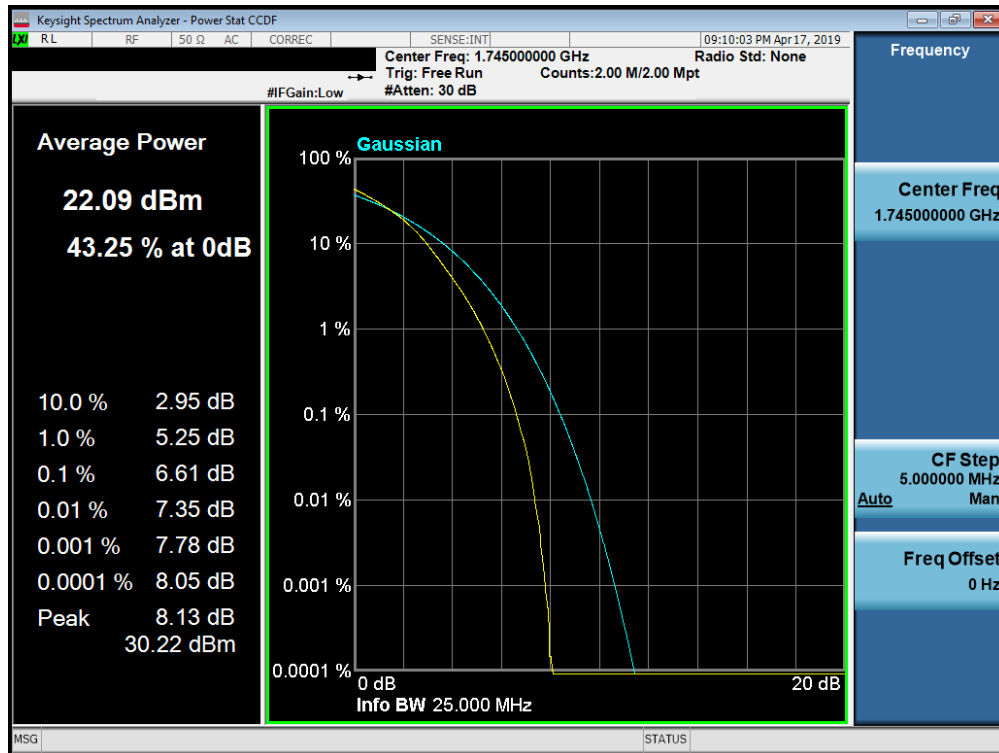


Plot 7-348. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 199 of 271



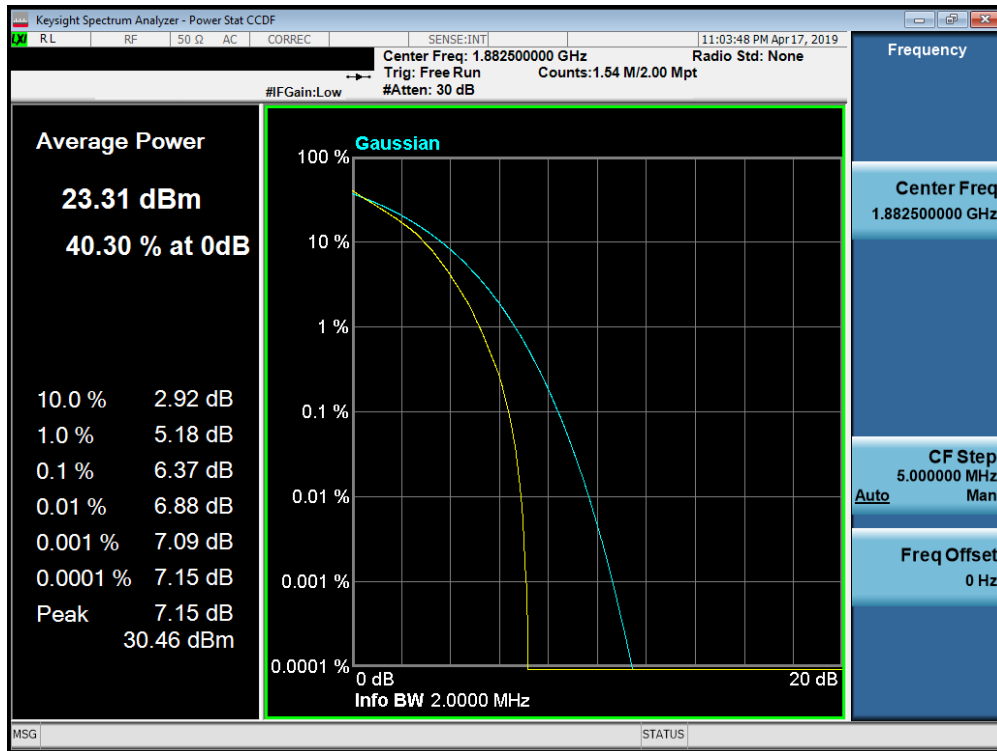
Plot 7-349. PAR Plot (Band 66/4 – 20.0MHz 16-QAM - Full RB Configuration)



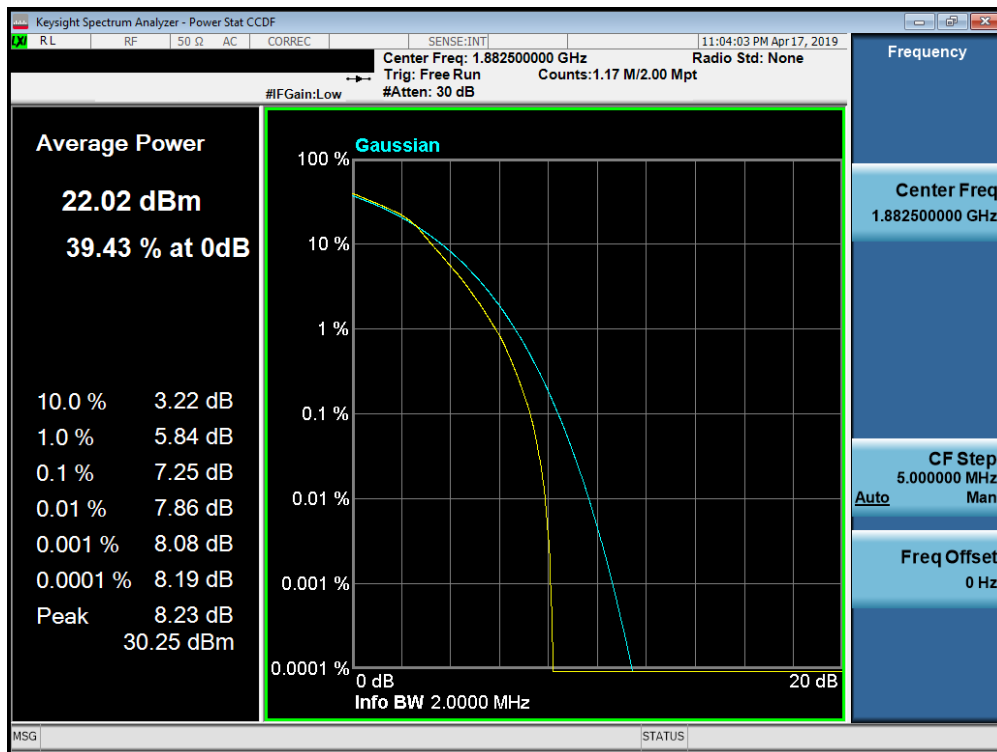
Plot 7-350. PAR Plot (Band 66/4 – 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 200 of 271

Band 25/2

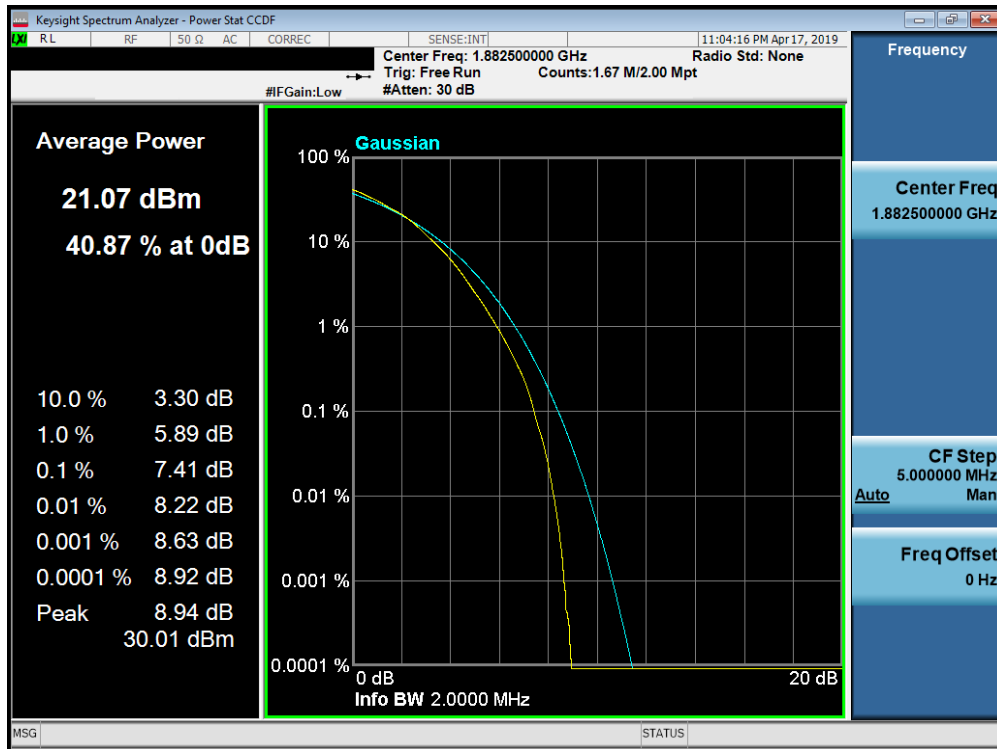


Plot 7-351. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

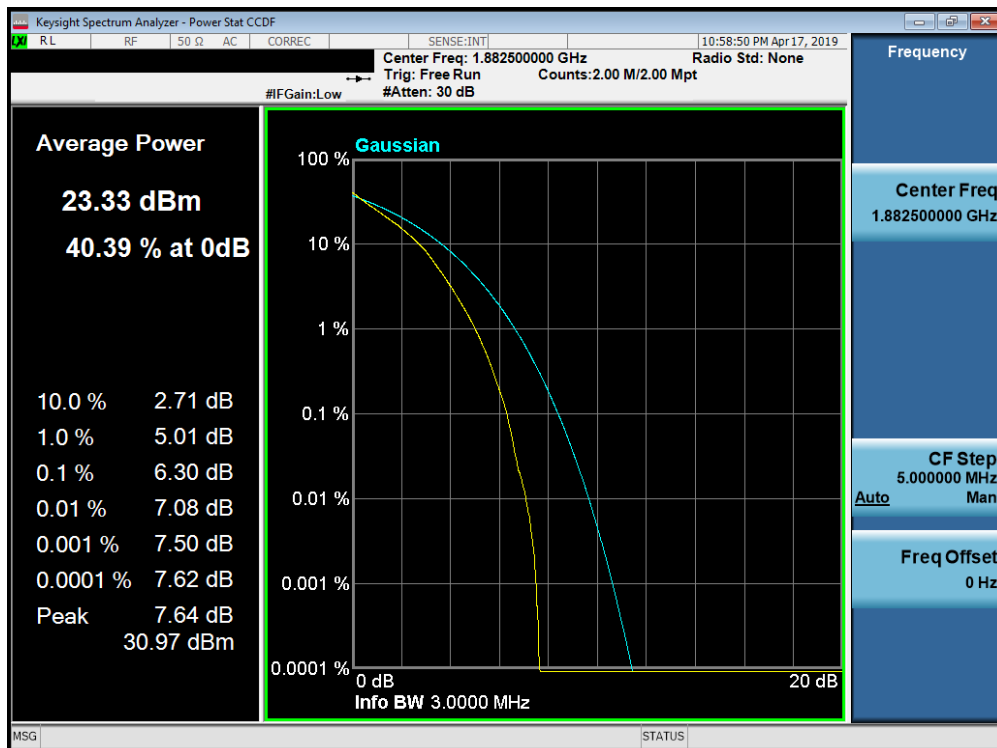


Plot 7-352. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 201 of 271

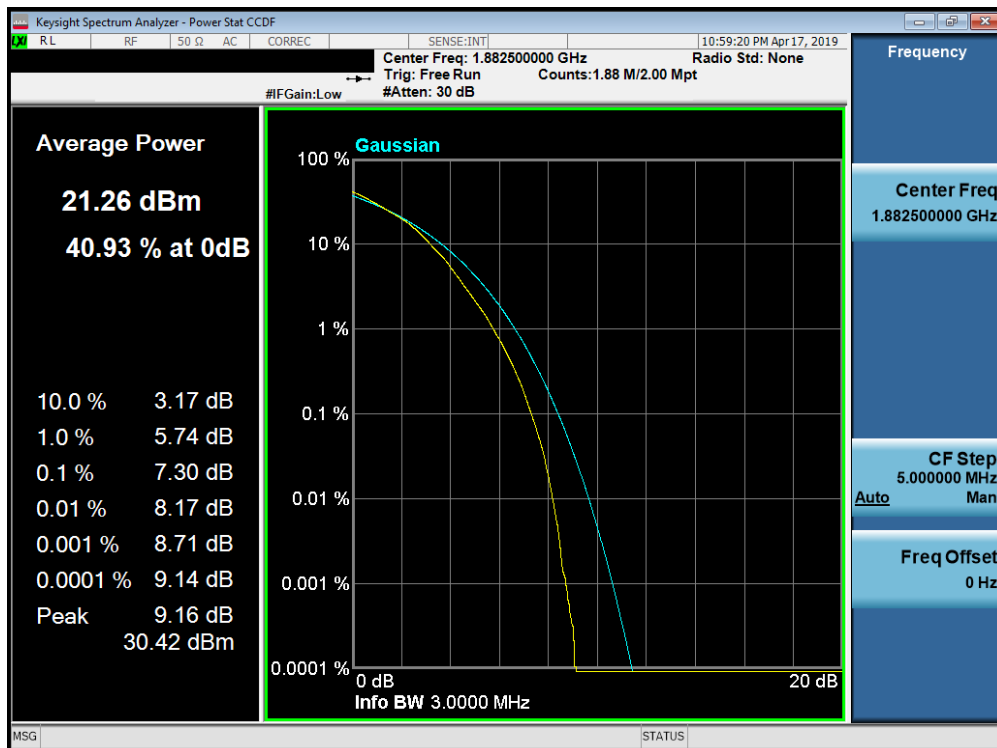
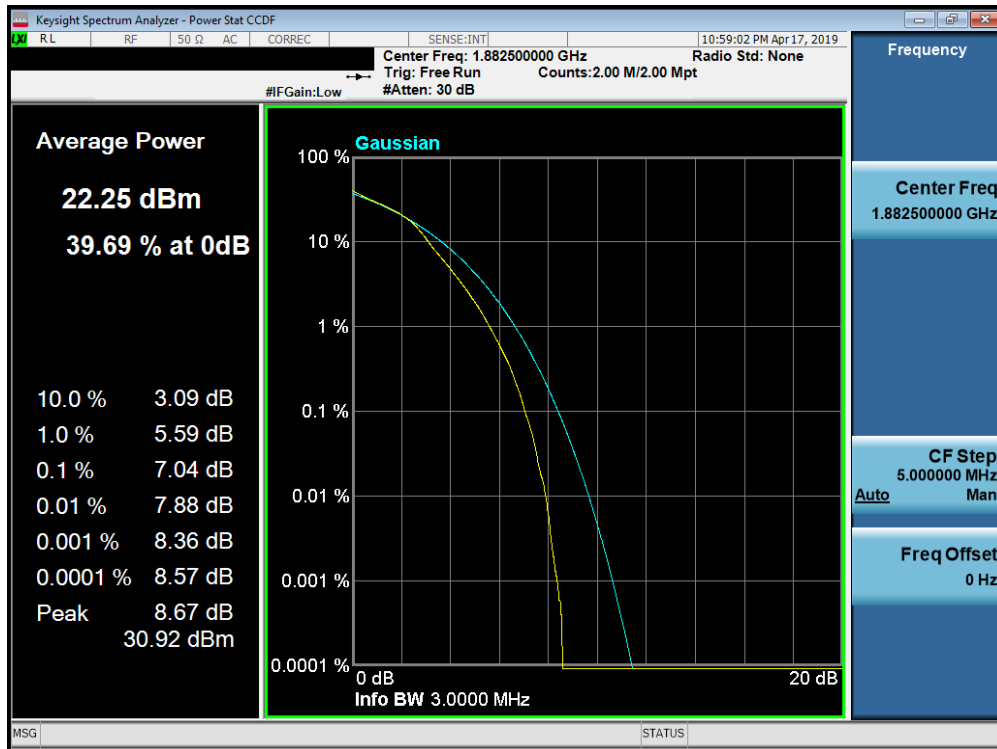


Plot 7-353. PAR Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)

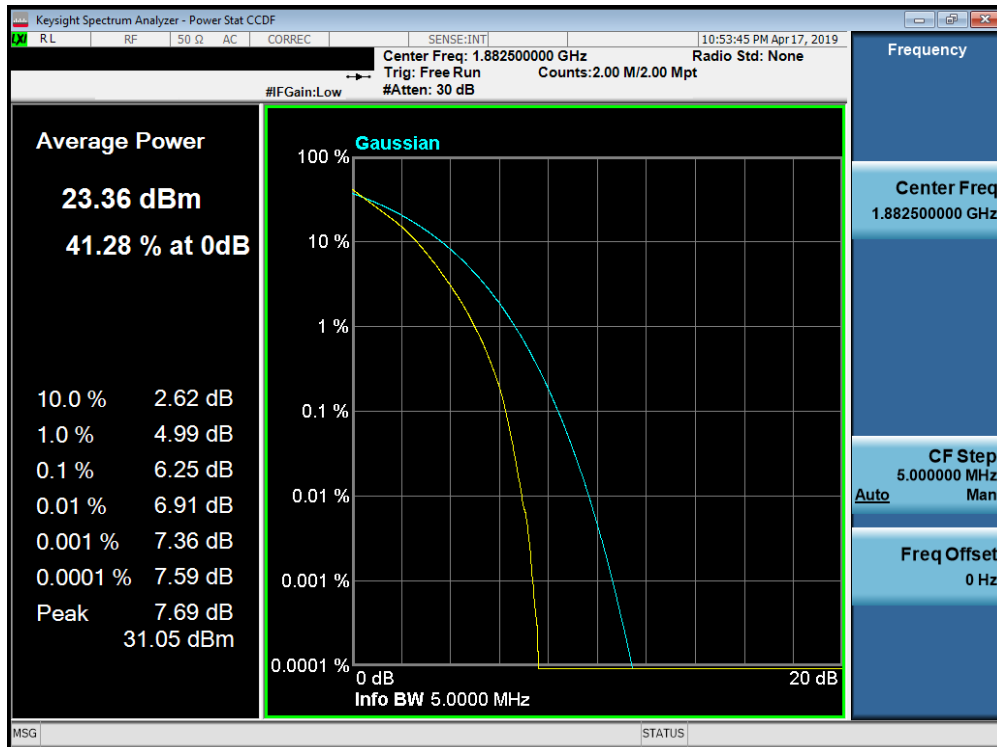


Plot 7-354. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

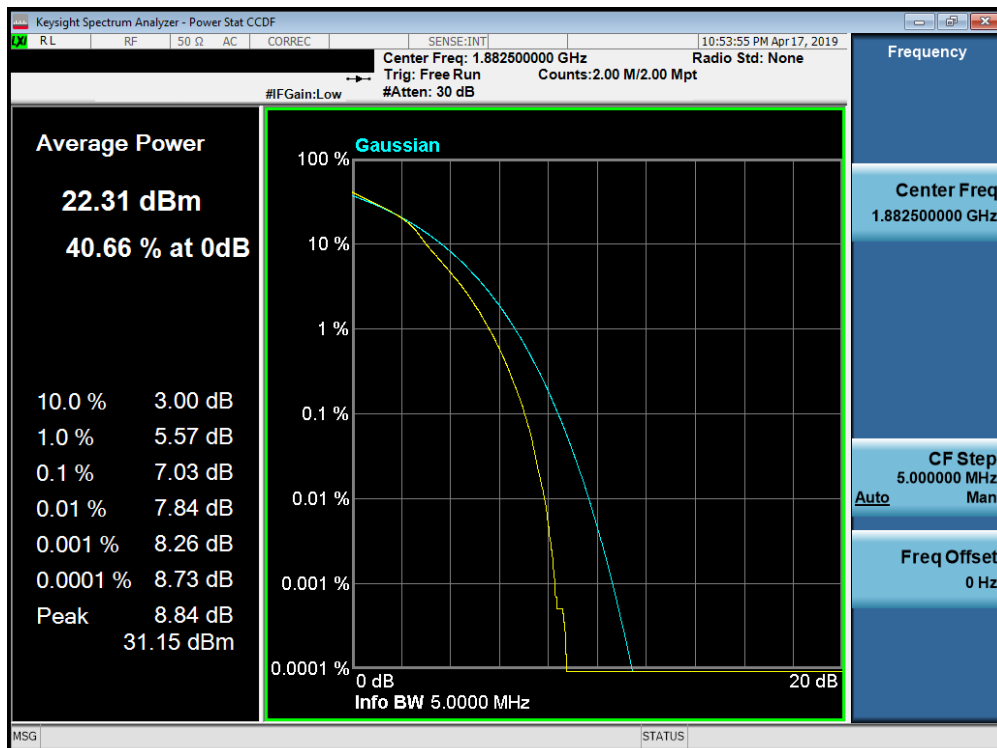
FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 202 of 271



FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 203 of 271

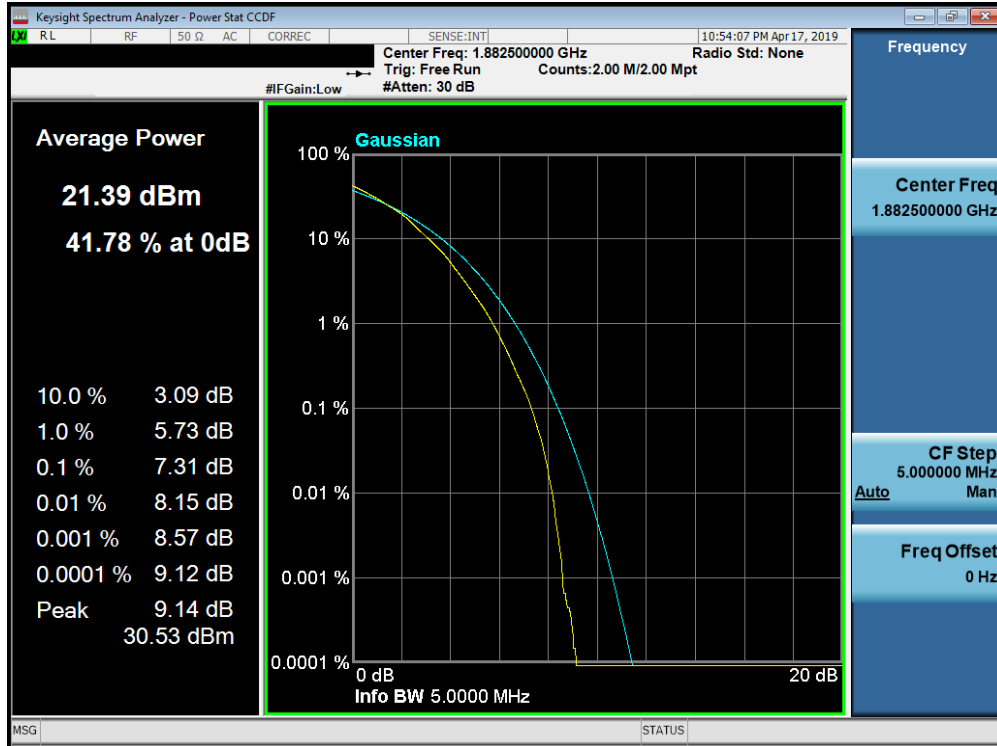


Plot 7-357. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

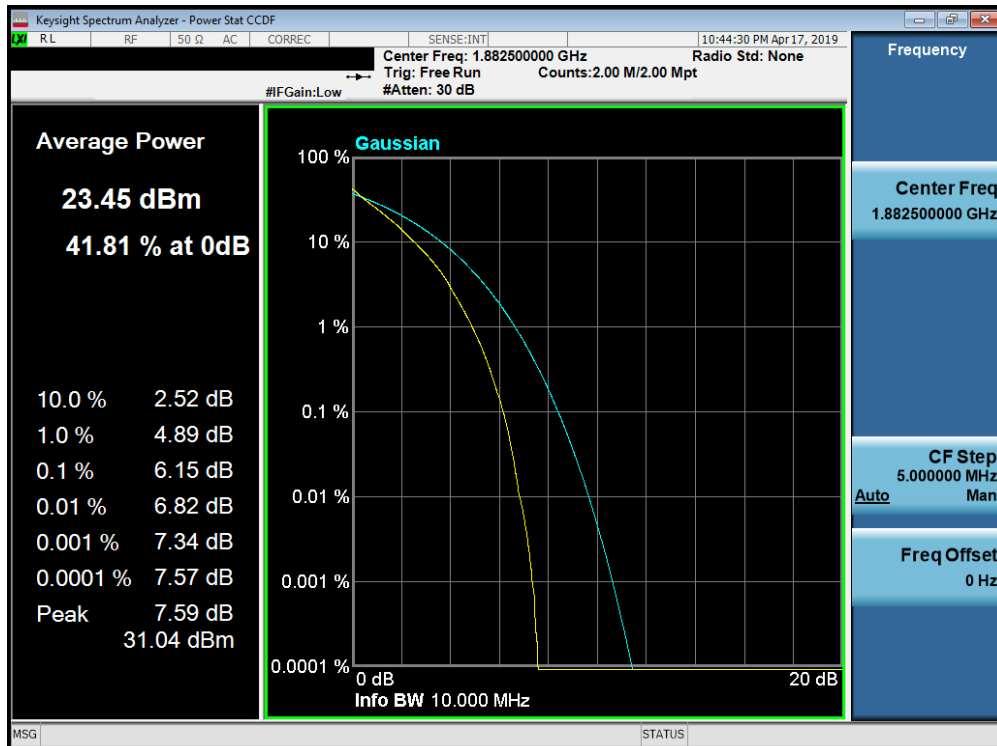


Plot 7-358. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 204 of 271

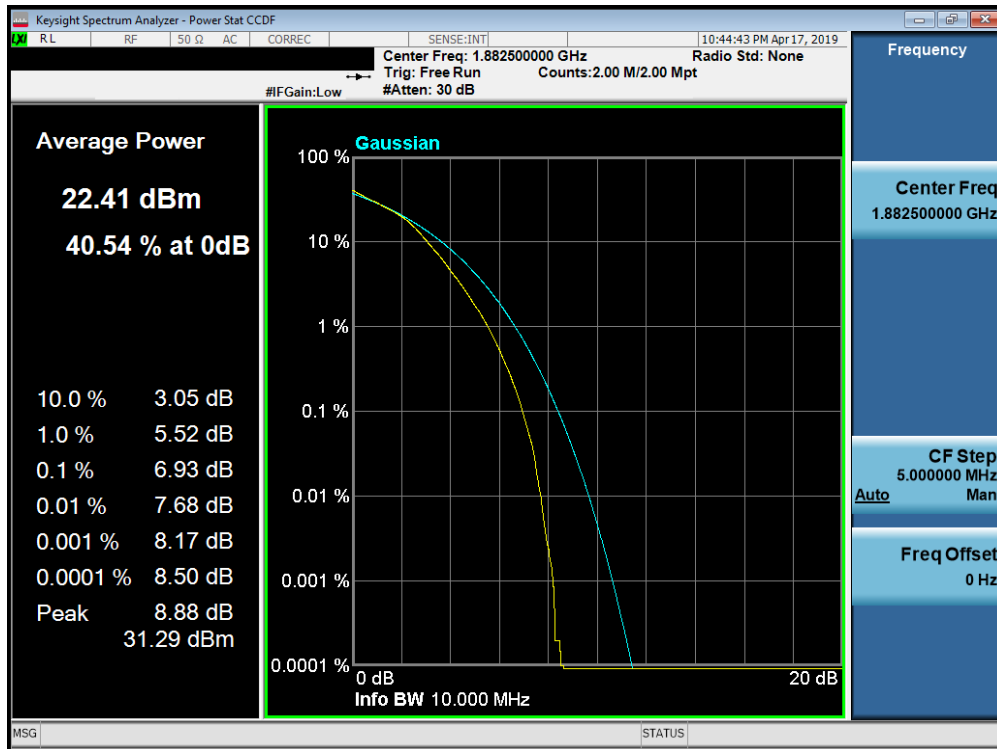


Plot 7-359. PAR Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)

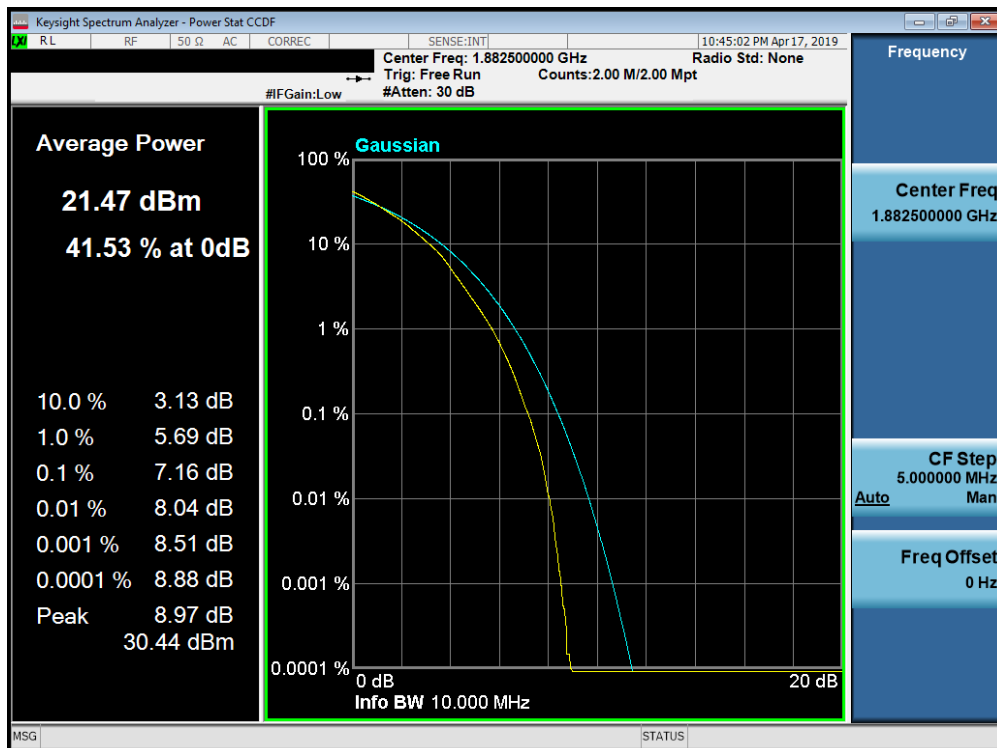


Plot 7-360. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 205 of 271

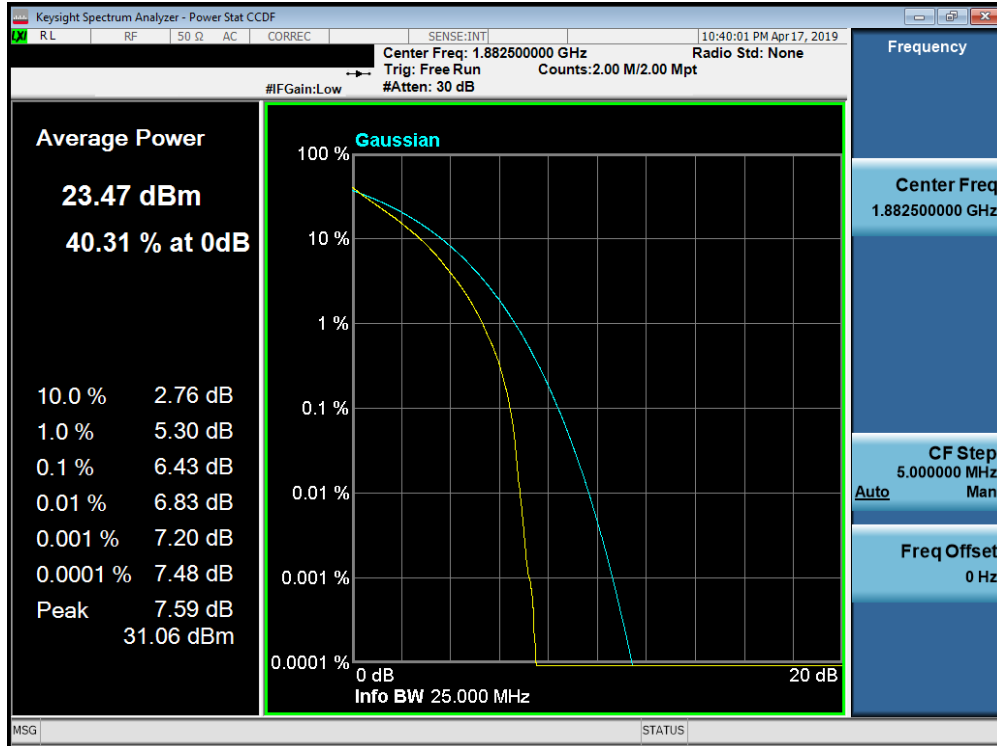


Plot 7-361. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

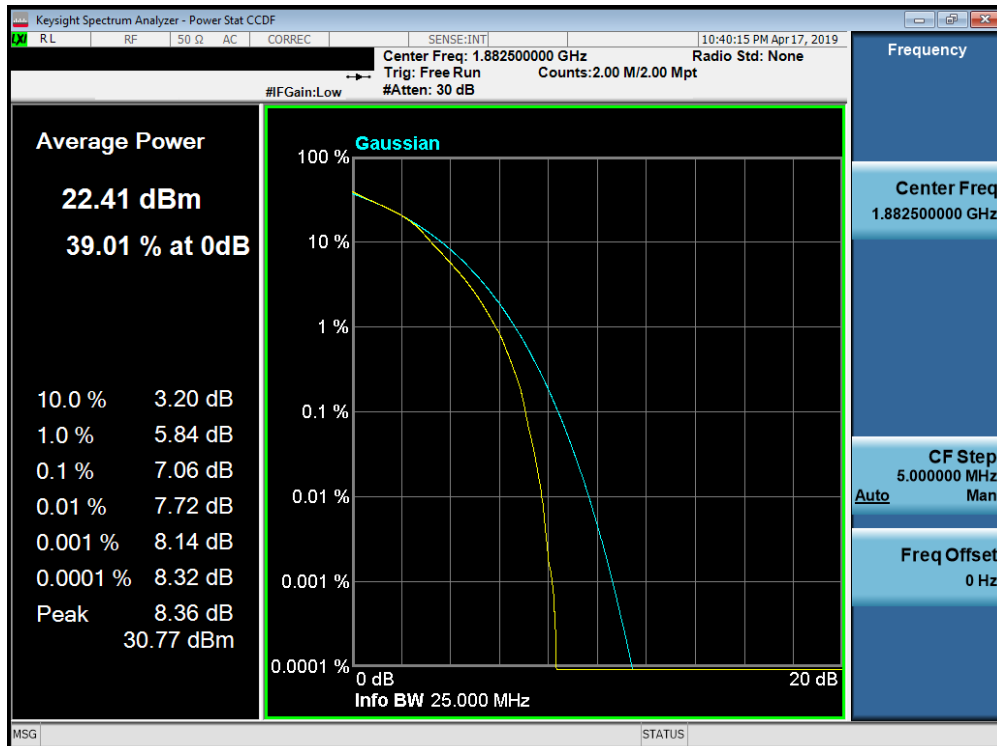


Plot 7-362. PAR Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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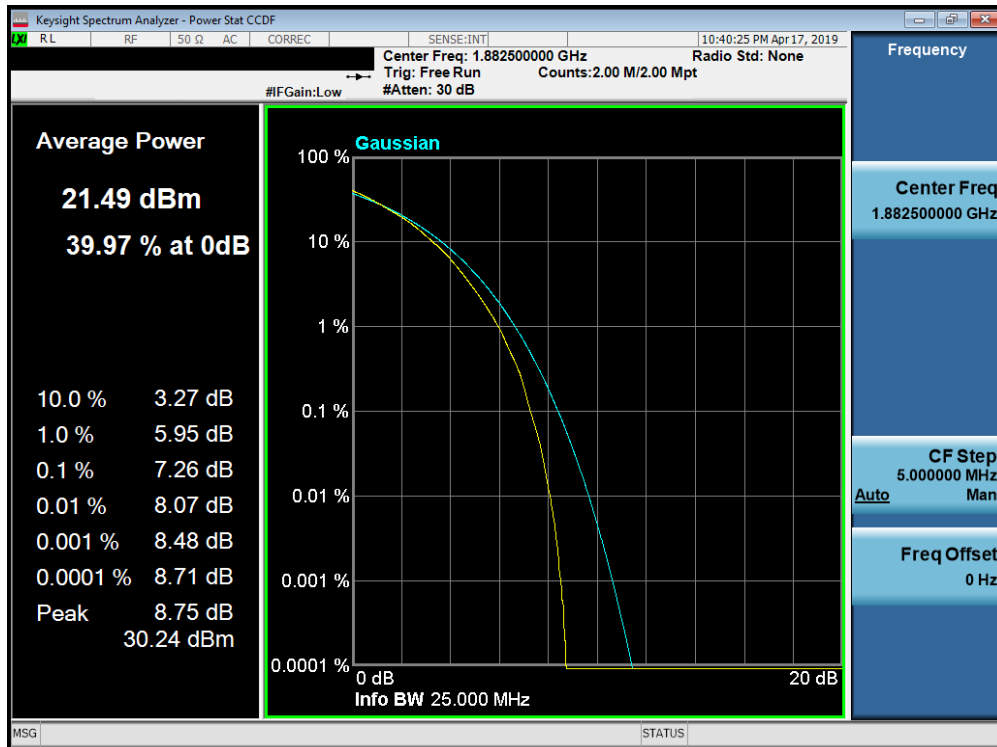


Plot 7-363. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

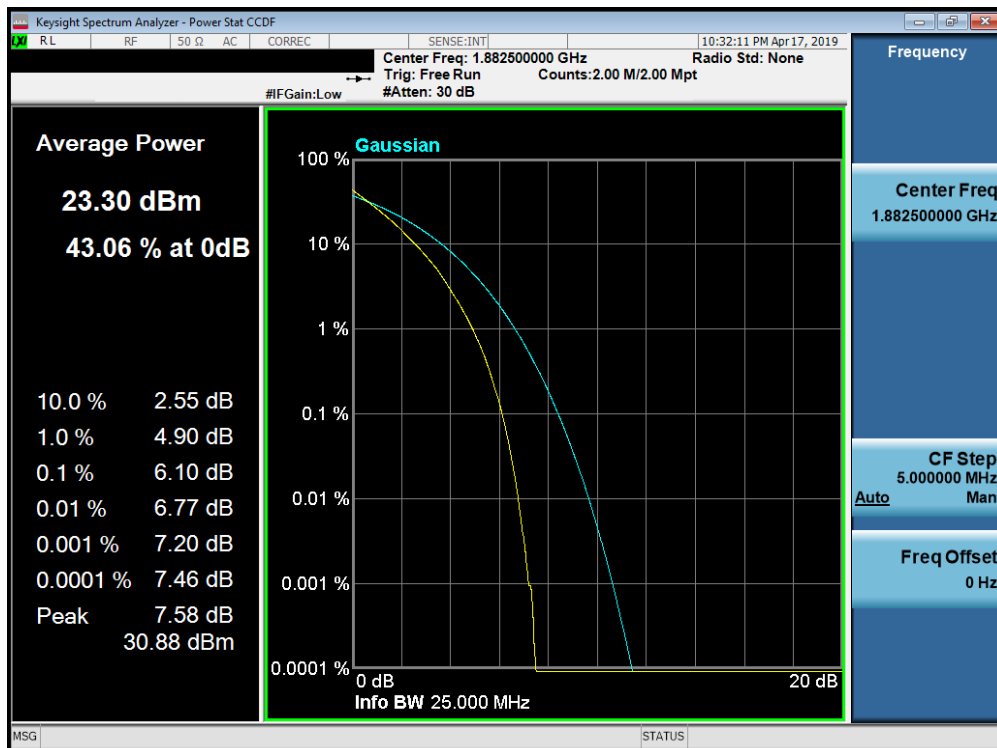


Plot 7-364. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 207 of 271

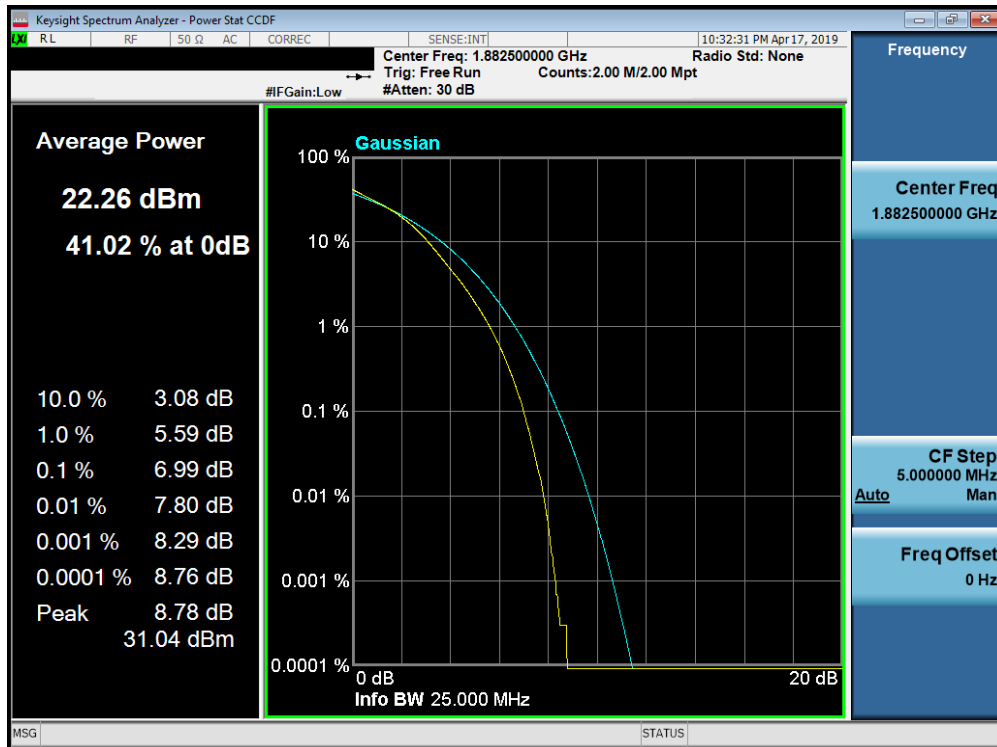


Plot 7-365. PAR Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)

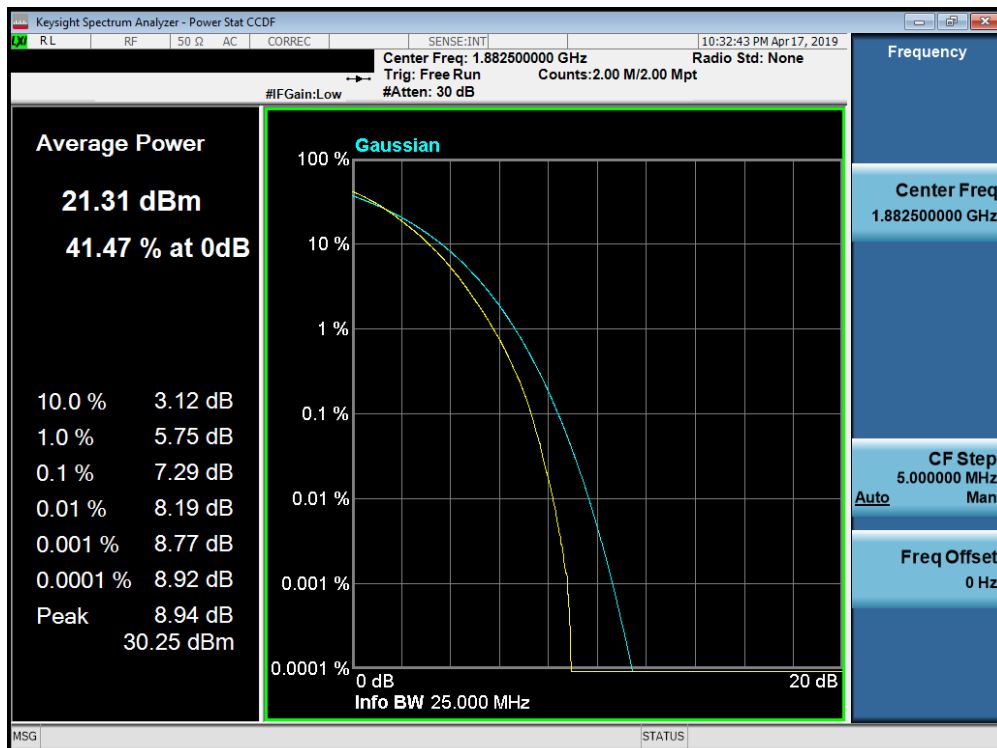


Plot 7-366. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-367. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-368. PAR Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 209 of 271

7.6 Additional Maximum Power Reduction (A-MPR)

§2.1046

Test Overview

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Test Case	NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	A-MPR [dB]	Measured Power [dBm]
1	01	310	120	5	39675	2498.5	QPSK	1	0	0	≤ 3	25.40
							16-QAM			≤ 1		24.16
							64-QAM			≤ 2		22.37
2				5	39675	2498.5	QPSK	1	9	0	0	27.34
							16-QAM			≤ 1		27.30
							64-QAM			≤ 2		26.13
3				10	39700	2501	QPSK	1	0	0	≤ 5	26.15
							16-QAM	1	0	≤ 1		25.16
							64-QAM	1	0	≤ 2		23.93
4				10	39700	2501	QPSK	20	0	0	≤ 2	24.86
							16-QAM	20	0	≤ 1		23.93
							64-QAM	20	0	≤ 2		22.95
5				10	39700	2501	QPSK	50	0	0	≤ 3	24.88
							16-QAM	50	0	≤ 1		23.91
							64-QAM	50	0	≤ 2		22.99
6				10	39700	2501	QPSK	25	20	0	≤ 1	24.95
							16-QAM	25	20	≤ 1		23.93
							64-QAM	25	20	≤ 2		22.94
7				10	39700	2501	QPSK	1	36	0	0	26.60
							16-QAM	1	36	≤ 1		25.02
							64-QAM	1	36	≤ 2		24.01
8				15	39725	2503.5	QPSK	1	0	0	≤ 5	23.45
							16-QAM	1	0	≤ 1		22.21
							64-QAM	1	0	≤ 2		21.49
9				15	39725	2503.5	QPSK	20	0	0	≤ 2	25.28
							16-QAM	20	0	≤ 1		24.20
							64-QAM	20	0	≤ 2		23.28
10				15	39725	2503.5	QPSK	75	0	0	≤ 4	23.16
							16-QAM	75	0	≤ 1		22.35
							64-QAM	75	0	≤ 2		21.35
11				15	39725	2503.5	QPSK	50	15	0	≤ 3	24.26
							16-QAM	50	15	≤ 1		23.30
							64-QAM	50	15	≤ 2		22.26
12				15	39725	2503.5	QPSK	1	60	0	0	26.12
							16-QAM	1	60	≤ 1		25.02
							64-QAM	1	60	≤ 2		24.08
13				20	39750	2506	QPSK	1	0	0	≤ 5	24.43
							16-QAM	1	0	≤ 1		22.24
							64-QAM	1	0	≤ 2		21.78
14				20	39750	2506	QPSK	20	0	0	≤ 2	25.18
							16-QAM	20	0	≤ 1		24.28
							64-QAM	20	0	≤ 2		23.26
15				20	39750	2506	QPSK	100	0	0	≤ 4	23.23
							16-QAM	100	0	≤ 1		22.32
							64-QAM	100	0	≤ 2		21.32
16				20	39750	2506	QPSK	75	24	0	≤ 3	24.20
							16-QAM	75	24	≤ 1		23.29
							64-QAM	75	24	≤ 2		22.26
17				20	39750	2506	QPSK	1	77	0	0	26.21
							16-QAM	1	77	≤ 1		25.16
							64-QAM	1	77	≤ 2		24.12
19	01	001	01	5	39675	2498.5	QPSK	1	0	0	0	27.38
							16-QAM			≤ 1		27.11
							64-QAM			≤ 2		26.26

Table 7-3. A-MPR Conducted Power Measurements

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7.7 Uplink Carrier Aggregation

§27.53(m)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

For Band 41, the minimum permissible attenuation level of any spurious emission is $55 + 10\log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-6. Test Instrument & Measurement Setup

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Test Notes

1. Uplink carrier aggregation is supported in this EUT while operating in Power Class 3.
2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-4, 7-6, 7-8, and 7-10 below, with both carriers set to transmit using 1RB.
3. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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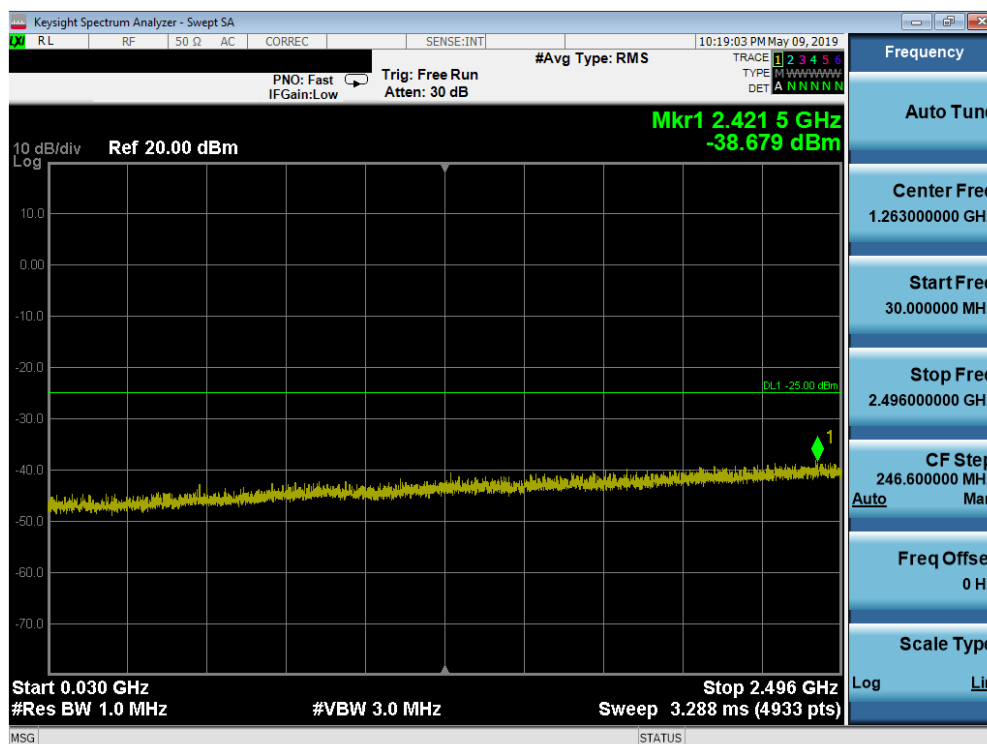
Uplink CA Configuration 41C (PC3)

Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	23.01
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	20.85
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	21.49

Table 7-4. Conducted Powers (B41 – PC3 – PCC: RB Size 1 Offset Max SCC: RB Size 1 Offset 0)

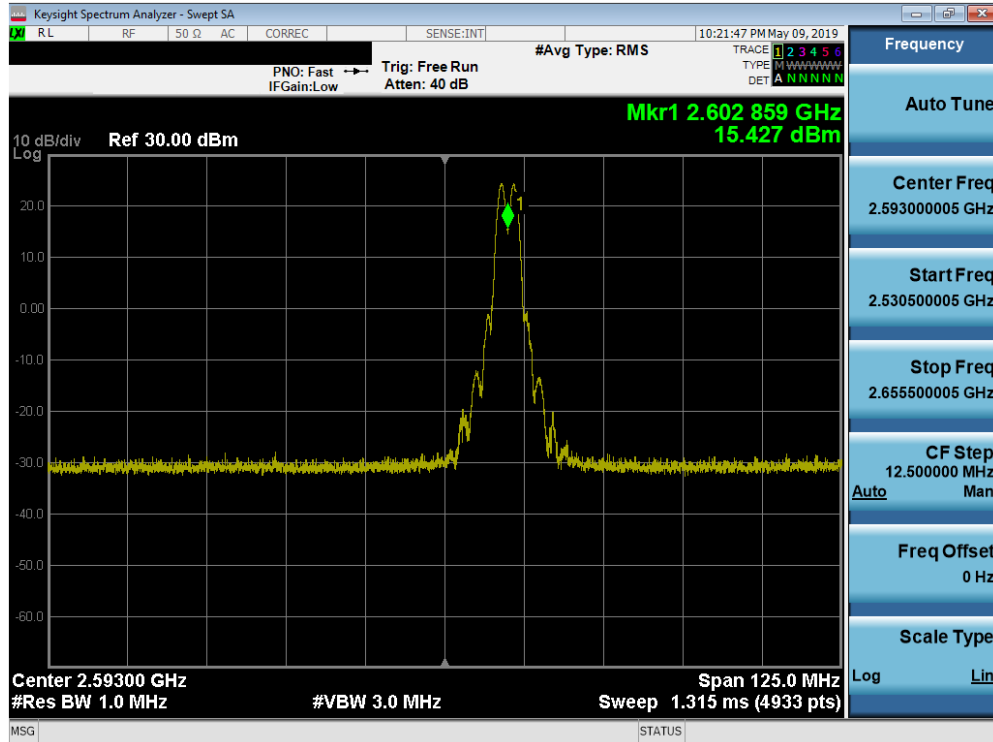
Power State	PCC							SCC							Power ULCA Tx.Power (dBm)
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	23.00
Max	LTE B41	20	39750	2506	16-QAM	100	0	LTE B41	20	39948	2525.8	16-QAM	100	0	22.56
Max	LTE B41	20	39750	2506	64-QAM	100	0	LTE B41	20	39948	2525.8	64-QAM	100	0	21.80

Table 7-5. Conducted Powers (B41 – PC3 with Various Combinations for 20MHz Channel Bandwidth)

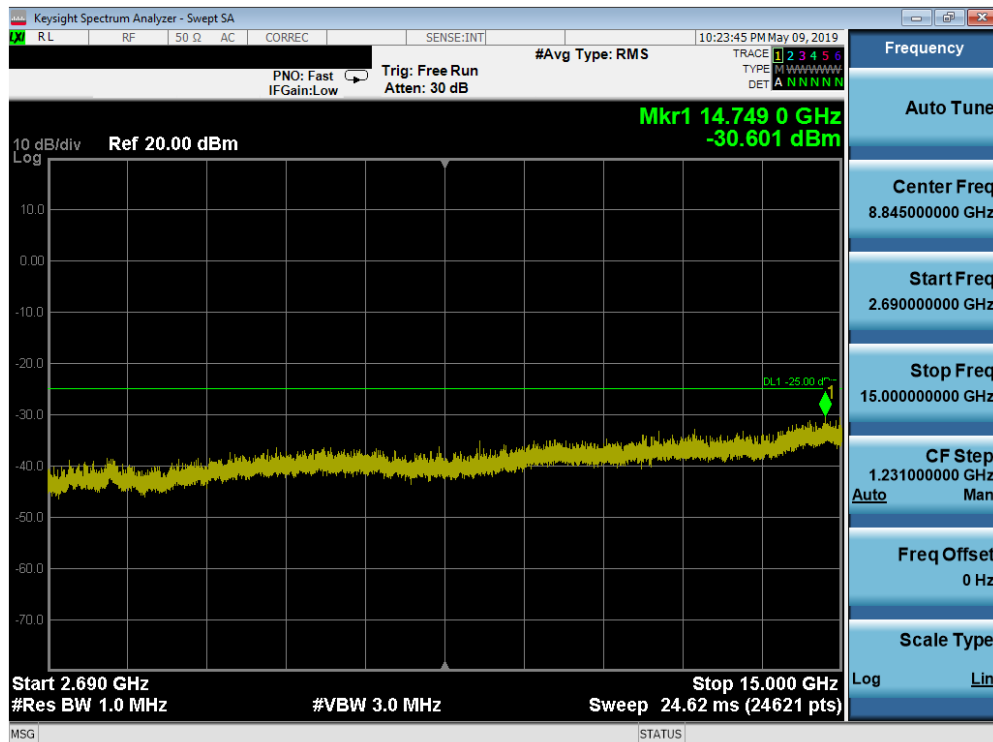


Plot 7-369. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMA505U	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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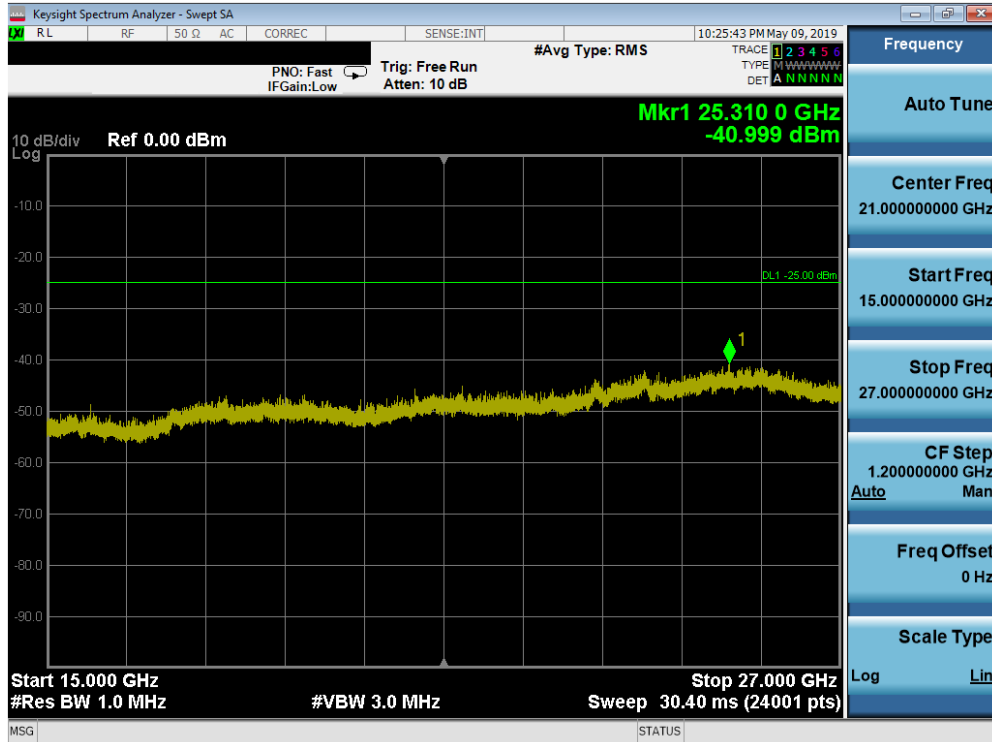


Plot 7-370. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

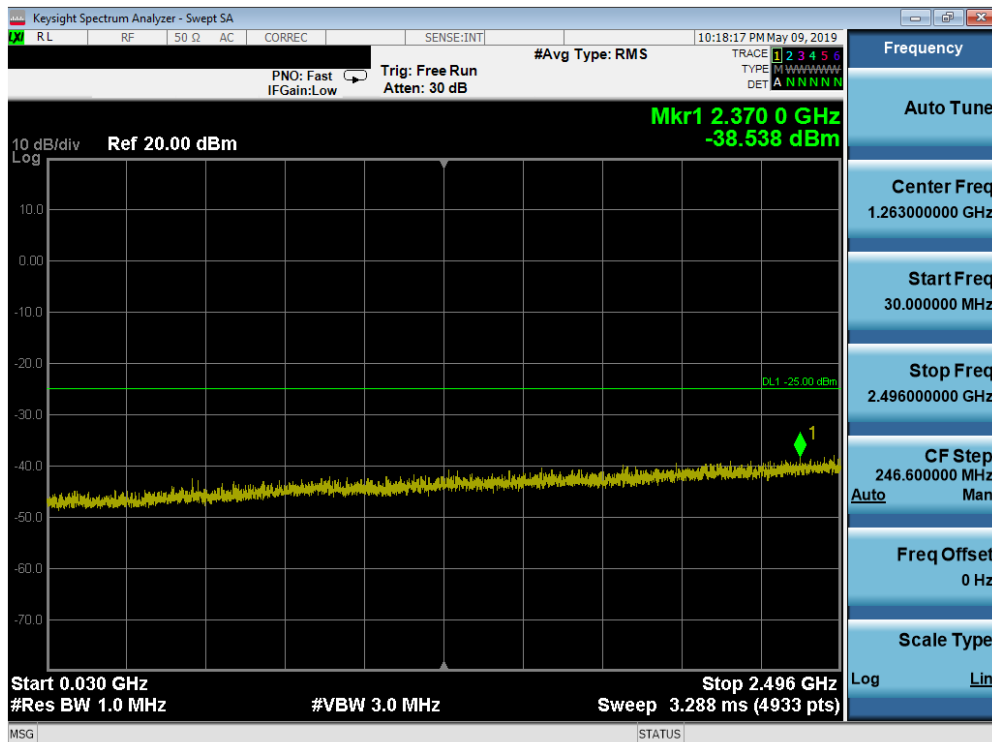


Plot 7-371. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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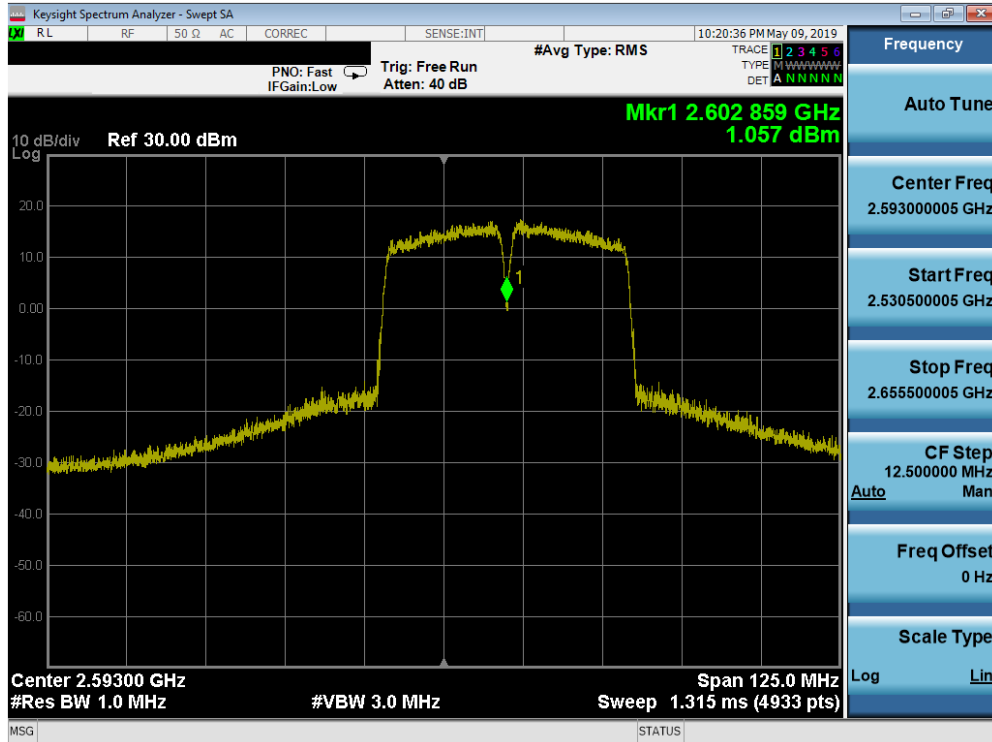


Plot 7-372. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

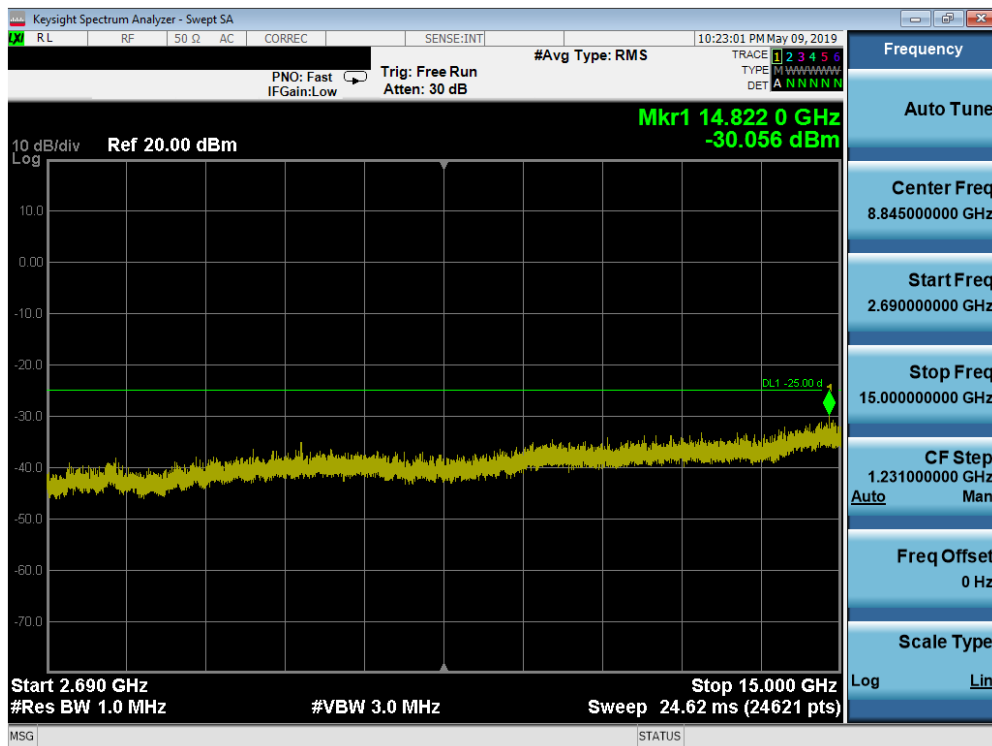


Plot 7-373. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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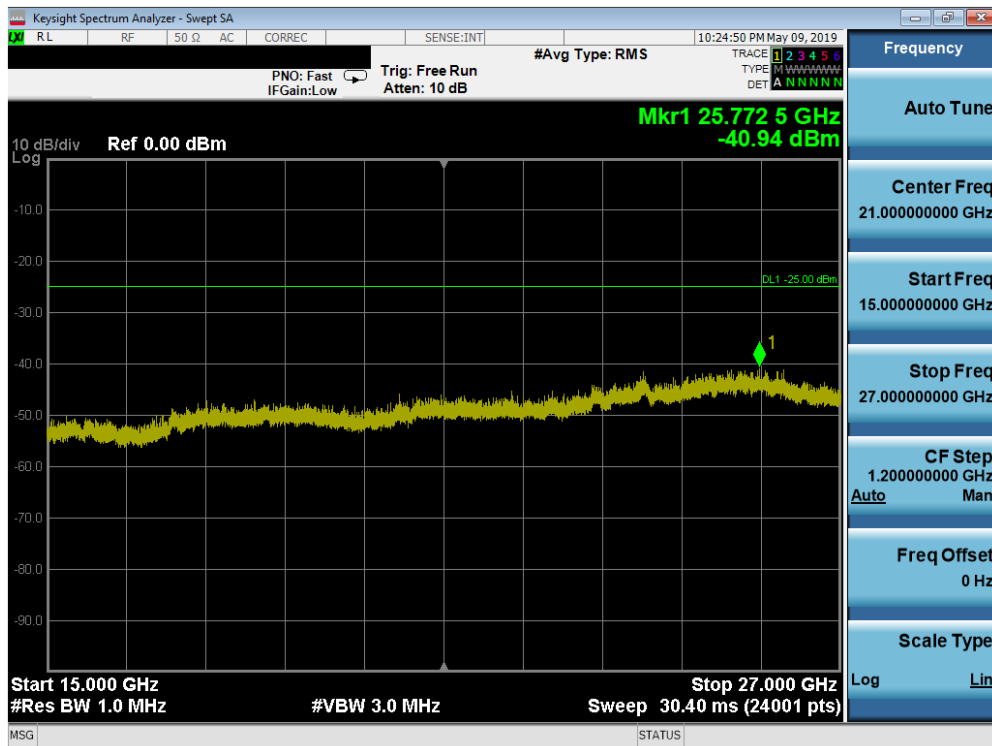


Plot 7-374. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

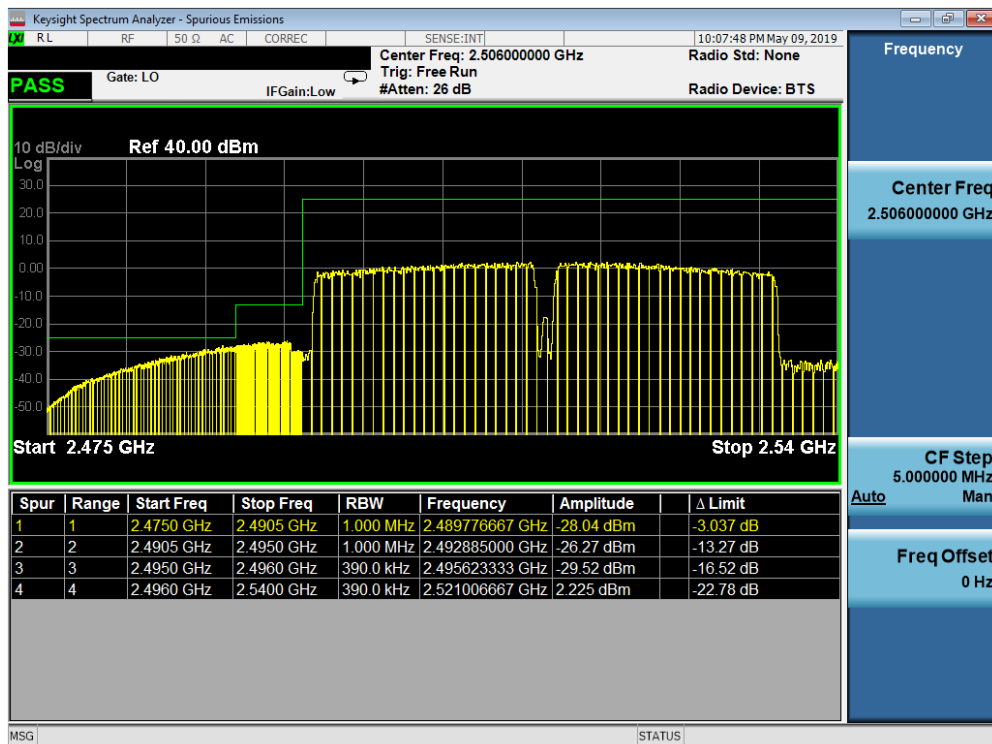


Plot 7-375. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 217 of 271

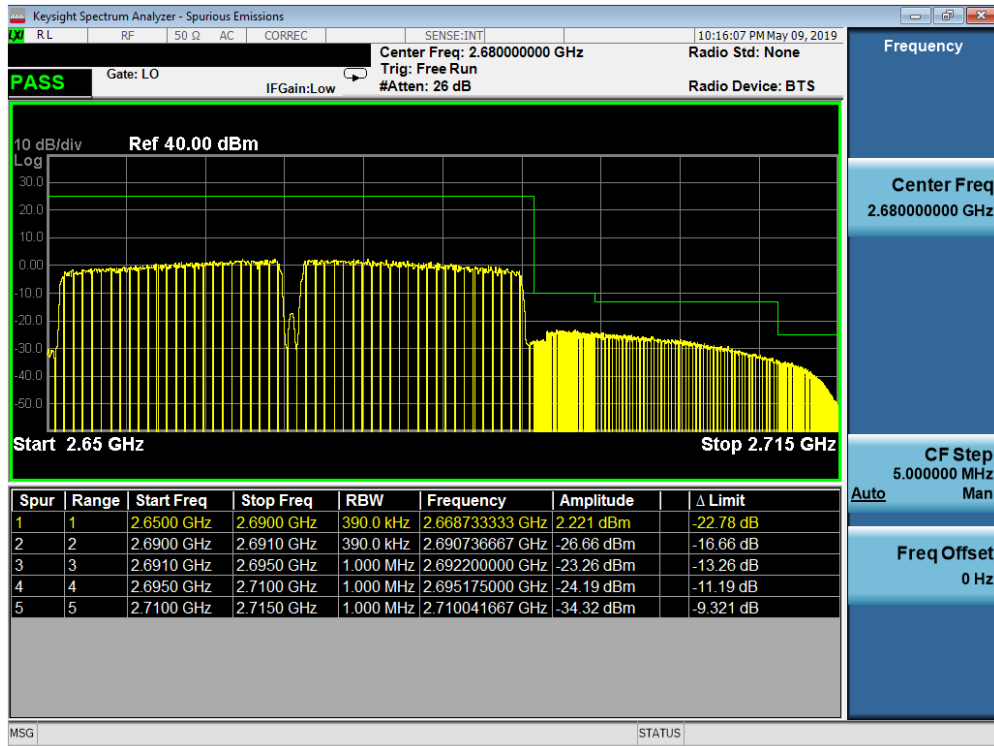


Plot 7-376. Conducted Spurious Plot (Band 41 – PC3 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Plot 7-377. Lower Band Edge Plot (Band 41 QPSK – PC3 – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-378. Upper Band Edge Plot (Band 41 QPSK – PC3 – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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7.8 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

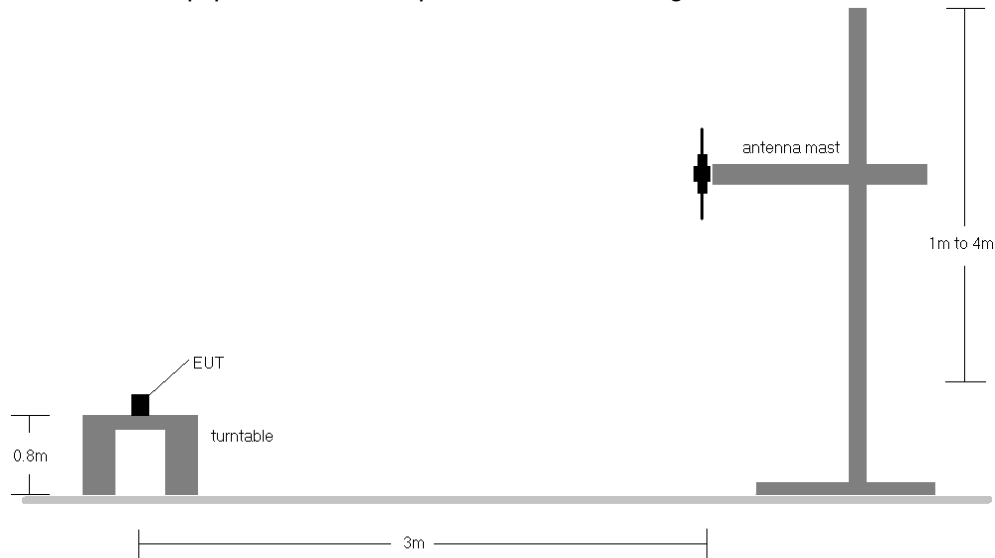


Figure 7-7. Radiated Test Setup <1GHz

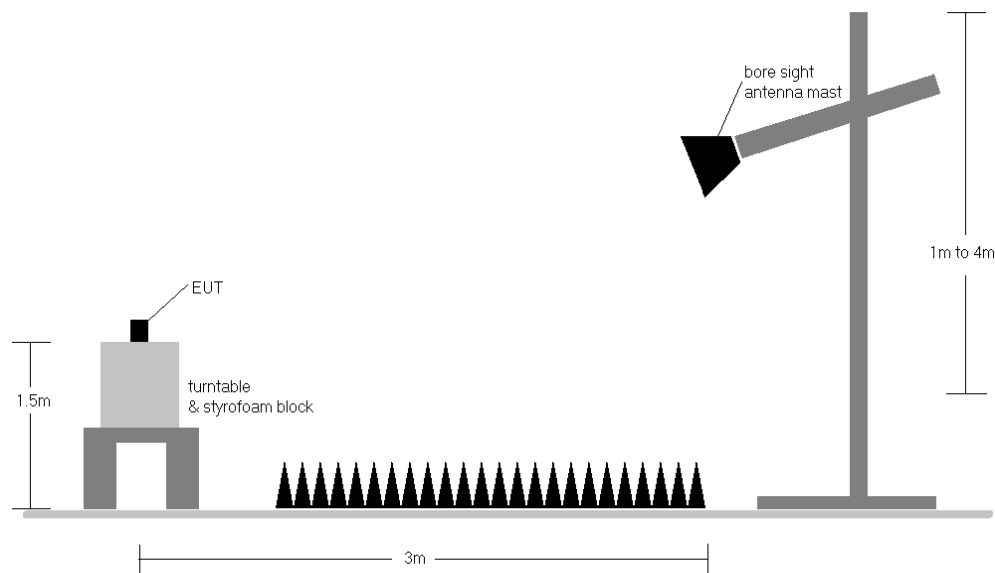


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
665.50	5	QPSK	H	212	111	1 / 24	13.99	2.90	14.74	0.030	34.77	-20.03
680.50	5	QPSK	H	184	89	1 / 24	15.69	3.20	16.74	0.047	34.77	-18.03
695.50	5	QPSK	H	186	96	1 / 24	15.81	3.30	16.96	0.050	34.77	-17.81
695.50	5	16-QAM	H	186	96	1 / 24	14.83	3.30	15.98	0.040	34.77	-18.79
695.50	5	64-QAM	H	186	96	1 / 24	14.28	3.30	15.43	0.035	34.77	-19.34
668.00	10	QPSK	H	212	111	1 / 49	14.04	2.90	14.79	0.030	34.77	-19.98
680.50	10	QPSK	H	184	89	1 / 49	15.84	3.20	16.89	0.049	34.77	-17.88
693.00	10	QPSK	H	186	96	1 / 49	15.95	3.30	17.10	0.051	34.77	-17.67
693.00	10	16-QAM	H	186	96	1 / 49	14.85	3.30	16.00	0.040	34.77	-18.77
693.00	10	64-QAM	H	186	96	1 / 49	14.46	3.30	15.61	0.036	34.77	-19.16
670.50	15	QPSK	H	212	111	1 / 74	14.25	3.00	15.10	0.032	34.77	-19.67
680.50	15	QPSK	H	184	89	1 / 74	16.01	3.20	17.06	0.051	34.77	-17.71
690.50	15	QPSK	H	186	96	1 / 74	16.23	3.30	17.38	0.055	34.77	-17.39
690.50	15	16-QAM	H	186	96	1 / 74	15.04	3.30	16.19	0.042	34.77	-18.58
690.50	15	64-QAM	H	186	96	1 / 74	14.32	3.30	15.47	0.035	34.77	-19.30
673.00	20	QPSK	H	212	111	1 / 99	14.06	3.10	15.01	0.032	34.77	-19.76
680.50	20	QPSK	H	184	89	1 / 99	15.82	3.20	16.87	0.049	34.77	-17.90
688.00	20	QPSK	H	186	96	1 / 99	16.04	3.30	17.19	0.052	34.77	-17.58
688.00	20	16-QAM	H	186	96	1 / 99	15.03	3.30	16.18	0.041	34.77	-18.59
688.00	20	64-QAM	H	186	96	1 / 99	14.30	3.30	15.45	0.035	34.77	-19.32
690.50	15	QPSK	V	262	143	1 / 74	14.89	3.10	15.84	0.038	34.77	-18.93

Table 7-3. ERP Data (Band 71)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	180	265	1 / 0	16.07	5.19	19.11	0.081	34.77	-15.66
707.50	1.4	QPSK	H	180	265	1 / 0	16.28	5.19	19.32	0.086	34.77	-15.45
715.30	1.4	QPSK	H	180	265	1 / 5	16.01	5.26	19.12	0.082	34.77	-15.66
707.50	1.4	16-QAM	H	180	265	1 / 5	15.22	5.19	18.26	0.067	34.77	-16.51
707.50	1.4	64-QAM	H	180	265	1 / 5	13.95	5.19	16.99	0.050	34.77	-17.78
700.50	3	QPSK	H	180	275	1 / 14	16.62	5.14	19.61	0.091	34.77	-15.16
707.50	3	QPSK	H	182	278	1 / 0	17.28	5.19	20.32	0.108	34.77	-14.45
714.50	3	QPSK	H	182	278	1 / 0	16.64	5.25	19.74	0.094	34.77	-15.03
707.50	3	16-QAM	H	182	278	1 / 0	15.73	5.19	18.77	0.075	34.77	-16.00
707.50	3	64-QAM	H	182	278	1 / 0	14.37	5.19	17.41	0.055	34.77	-17.36
707.50	3	QPSK	V	321	233	1 / 0	14.47	5.19	17.51	0.056	34.77	-17.26

Table 7-4. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
701.50	5	QPSK	H	180	273	1 / 24	16.91	5.15	19.91	0.098	34.77	-14.86
707.50	5	QPSK	H	175	275	1 / 24	16.80	5.19	19.84	0.096	34.77	-14.93
713.50	5	QPSK	H	182	275	1 / 24	16.85	5.24	19.94	0.099	34.77	-14.83
707.50	5	16-QAM	H	175	275	1 / 0	15.88	5.19	18.92	0.078	34.77	-15.85
707.50	5	64-QAM	H	175	275	1 / 0	14.57	5.19	17.61	0.058	34.77	-17.16
704.00	10	QPSK	H	179	276	1 / 49	16.62	5.17	19.64	0.092	34.77	-15.13
707.50	10	QPSK	H	184	276	1 / 0	16.97	5.19	20.01	0.100	34.77	-14.76
711.00	10	QPSK	H	177	273	1 / 49	16.35	5.22	19.42	0.088	34.77	-15.35
707.50	10	16-QAM	H	184	276	1 / 0	15.78	5.19	18.82	0.076	34.77	-15.95
707.50	10	64-QAM	H	184	276	1 / 0	14.44	5.19	17.48	0.056	34.77	-17.29

Table 7-5. ERP Data (Band 12/17)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	154	277	1 / 24	17.42	6.09	21.36	0.137	34.77	-13.41
782.00	5	QPSK	H	155	277	1 / 24	17.39	6.13	21.37	0.137	34.77	-13.40
784.50	5	QPSK	H	155	277	1 / 0	17.54	6.18	21.57	0.144	34.77	-13.20
784.50	5	16-QAM	H	155	277	1 / 0	16.38	6.18	20.41	0.110	34.77	-14.36
784.50	5	64-QAM	H	155	277	1 / 0	15.23	6.18	19.26	0.084	34.77	-15.51
782.00	10	QPSK	H	155	277	1 / 49	17.19	6.13	21.17	0.131	34.77	-13.60
782.00	10	16-QAM	H	155	277	1 / 49	15.91	6.13	19.89	0.098	34.77	-14.88
782.00	10	64-QAM	H	155	277	1 / 49	14.77	6.13	18.75	0.075	34.77	-16.02
784.50	5	QPSK	V	394	224	1 / 0	14.00	6.18	18.03	0.064	34.77	-16.74

Table 7-6. ERP Data (Band 13)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	147	301	1 / 0	14.06	6.89	18.80	0.076	38.45	-19.65
836.50	1.4	QPSK	H	135	287	1 / 0	13.81	7.08	18.74	0.075	38.45	-19.71
848.30	1.4	QPSK	H	134	298	1 / 5	13.81	7.28	18.94	0.078	38.45	-19.51
824.70	1.4	16-QAM	H	147	301	1 / 0	13.42	6.89	18.16	0.065	38.45	-20.29
848.30	1.4	64-QAM	H	134	298	1 / 0	11.45	7.28	16.58	0.045	38.45	-21.87
825.50	3	QPSK	H	147	301	1 / 0	13.94	6.90	18.69	0.074	38.45	-19.76
836.50	3	QPSK	H	135	287	1 / 0	13.72	7.08	18.65	0.073	38.45	-19.80
847.50	3	QPSK	H	134	298	1 / 14	13.83	7.26	18.94	0.078	38.45	-19.51
825.50	3	16-QAM	H	147	301	1 / 0	13.38	6.90	18.13	0.065	38.45	-20.32
825.50	3	64-QAM	H	147	301	1 / 0	11.92	6.90	16.67	0.046	38.45	-21.78
826.50	5	QPSK	H	144	288	1 / 0	14.16	6.92	18.93	0.078	38.45	-19.52
836.50	5	QPSK	H	138	294	1 / 0	13.94	7.08	18.87	0.077	38.45	-19.58
846.50	5	QPSK	H	131	303	1 / 24	13.94	7.25	19.04	0.080	38.45	-19.41
826.50	5	16-QAM	H	144	288	1 / 0	13.43	6.92	18.20	0.066	38.45	-20.25
846.50	5	64-QAM	H	131	303	1 / 0	11.51	7.25	16.61	0.046	38.45	-21.84
829.00	10	QPSK	H	144	288	1 / 0	14.21	6.96	19.02	0.080	38.45	-19.43
836.50	10	QPSK	H	138	294	1 / 0	13.96	7.08	18.89	0.078	38.45	-19.56
844.00	10	QPSK	H	131	303	1 / 49	14.03	7.21	19.09	0.081	38.45	-19.36
829.00	10	16-QAM	H	144	288	1 / 0	13.23	6.96	18.04	0.064	38.45	-20.41
829.00	10	64-QAM	H	144	288	1 / 0	12.09	6.96	16.90	0.049	38.45	-21.55
836.50	10	QPSK	V	275	258	1 / 0	13.88	7.08	18.81	0.076	38.45	-19.64

Table 7-7. ERP Data (Band 26/5)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	147	301	1 / 0	14.50	7.00	19.35	0.086	38.45	-19.10
836.50	15	QPSK	H	135	287	1 / 0	14.49	7.08	19.42	0.088	38.45	-19.03
841.50	15	QPSK	H	134	298	1 / 74	14.10	7.17	19.12	0.082	38.45	-19.34
836.50	15	16-QAM	H	135	287	1 / 0	13.49	7.08	18.42	0.070	38.45	-20.03
836.50	15	64-QAM	H	135	287	1 / 0	12.35	7.08	17.28	0.053	38.45	-21.17

Table 7-8. ERP Data (Band 26)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	108	23	1 / 5	13.27	9.44	22.71	0.187	30.00	-7.29
1745.00	1.4	QPSK	H	108	25	1 / 0	12.82	9.23	22.05	0.160	30.00	-7.95
1779.30	1.4	QPSK	H	108	32	1 / 0	13.52	9.26	22.78	0.190	30.00	-7.22
1779.30	1.4	16-QAM	H	108	32	1 / 0	12.68	9.26	21.94	0.156	30.00	-8.06
1779.30	1.4	64-QAM	H	108	32	1 / 0	11.59	9.26	20.85	0.122	30.00	-9.15
1711.50	3	QPSK	H	108	23	1 / 14	13.26	9.44	22.70	0.186	30.00	-7.30
1745.00	3	QPSK	H	108	25	1 / 0	12.88	9.23	22.11	0.163	30.00	-7.89
1778.50	3	QPSK	H	108	32	1 / 0	13.41	9.26	22.67	0.185	30.00	-7.33
1778.50	3	16-QAM	H	108	32	1 / 0	12.48	9.26	21.74	0.149	30.00	-8.26
1778.50	3	64-QAM	H	108	32	1 / 0	11.70	9.26	20.96	0.125	30.00	-9.04
1712.50	5	QPSK	H	105	19	1 / 24	13.40	9.43	22.83	0.192	30.00	-7.17
1745.00	5	QPSK	H	105	20	1 / 0	12.78	9.23	22.01	0.159	30.00	-7.99
1777.50	5	QPSK	H	105	19	1 / 0	13.26	9.26	22.52	0.178	30.00	-7.48
1777.50	5	16-QAM	H	105	19	1 / 0	12.75	9.26	22.01	0.159	30.00	-7.99
1777.50	5	64-QAM	H	105	19	1 / 0	11.69	9.26	20.95	0.124	30.00	-9.05
1715.00	10	QPSK	H	108	17	1 / 49	13.42	9.42	22.84	0.192	30.00	-7.16
1745.00	10	QPSK	H	100	17	1 / 0	12.94	9.23	22.17	0.165	30.00	-7.83
1775.00	10	QPSK	H	123	11	1 / 0	13.44	9.25	22.70	0.186	30.00	-7.30
1775.00	10	16-QAM	H	123	11	1 / 0	12.53	9.25	21.79	0.151	30.00	-8.21
1775.00	10	64-QAM	H	123	11	1 / 0	11.77	9.25	21.03	0.127	30.00	-8.97
1717.50	15	QPSK	H	108	25	1 / 74	13.32	9.40	22.72	0.187	30.00	-7.28
1745.00	15	QPSK	H	100	25	1 / 0	12.90	9.23	22.13	0.163	30.00	-7.87
1772.50	15	QPSK	H	123	25	1 / 0	13.42	9.25	22.67	0.185	30.00	-7.33
1772.50	15	16-QAM	H	123	25	1 / 0	12.78	9.25	22.03	0.159	30.00	-7.97
1772.50	15	64-QAM	H	123	25	1 / 0	11.78	9.25	21.03	0.127	30.00	-8.97
1720.00	20	QPSK	H	108	17	1 / 99	13.47	9.38	22.85	0.193	30.00	-7.15
1745.00	20	QPSK	H	100	17	1 / 0	13.11	9.23	22.34	0.171	30.00	-7.66
1770.00	20	QPSK	H	123	11	1 / 0	13.58	9.24	22.82	0.191	30.00	-7.18
1745.00	20	16-QAM	H	100	17	1 / 0	12.47	9.23	21.70	0.148	30.00	-8.30
1770.00	20	64-QAM	H	123	11	1 / 0	11.43	9.24	20.67	0.117	30.00	-9.33
1720.00	20	QPSK	V	100	113	1 / 99	13.24	9.38	22.62	0.183	30.00	-7.38

Table 7-9. EIRP Data (Band 66/4)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 226 of 271

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	102	129	1 / 0	12.15	9.07	21.22	0.132	33.01	-11.79
1882.50	1.4	QPSK	V	102	127	1 / 5	11.74	9.16	20.90	0.123	33.01	-12.12
1914.30	1.4	QPSK	V	117	125	1 / 0	10.67	9.31	19.98	0.099	33.01	-13.04
1850.70	1.4	16-QAM	V	102	129	1 / 0	11.27	9.07	20.34	0.108	33.01	-12.67
1850.70	1.4	64-QAM	V	102	129	1 / 0	10.10	9.07	19.17	0.083	33.01	-13.84
1851.50	3	QPSK	V	102	129	1 / 0	12.16	9.07	21.23	0.133	33.01	-11.78
1882.50	3	QPSK	V	102	127	1 / 14	11.77	9.16	20.93	0.124	33.01	-12.09
1913.50	3	QPSK	V	117	125	1 / 0	10.77	9.30	20.07	0.102	33.01	-12.94
1851.50	3	16-QAM	V	102	129	1 / 0	11.09	9.07	20.16	0.104	33.01	-12.85
1851.50	3	64-QAM	V	102	129	1 / 0	9.93	9.07	19.00	0.079	33.01	-14.01
1852.50	5	QPSK	V	102	129	1 / 0	12.23	9.07	21.30	0.135	33.01	-11.71
1882.50	5	QPSK	V	102	127	1 / 24	11.81	9.16	20.97	0.125	33.01	-12.05
1912.50	5	QPSK	V	117	125	1 / 0	10.86	9.29	20.16	0.104	33.01	-12.85
1852.50	5	16-QAM	V	102	129	1 / 0	11.14	9.07	20.21	0.105	33.01	-12.80
1852.50	5	64-QAM	V	102	129	1 / 0	10.06	9.07	19.13	0.082	33.01	-13.88
1855.00	10	QPSK	V	102	129	1 / 0	12.32	9.08	21.39	0.138	33.01	-11.62
1882.50	10	QPSK	V	102	127	1 / 49	12.08	9.16	21.24	0.133	33.01	-11.78
1910.00	10	QPSK	V	117	125	1 / 0	10.92	9.27	20.20	0.105	33.01	-12.81
1855.00	10	16-QAM	V	102	129	1 / 0	11.08	9.08	20.15	0.104	33.01	-12.86
1882.50	10	64-QAM	V	102	127	1 / 49	9.98	9.16	19.14	0.082	33.01	-13.88
1857.50	15	QPSK	V	102	129	1 / 0	12.43	9.08	21.51	0.142	33.01	-11.50
1882.50	15	QPSK	V	102	127	1 / 74	12.02	9.16	21.18	0.131	33.01	-11.84
1907.50	15	QPSK	V	117	125	1 / 0	10.95	9.26	20.21	0.105	33.01	-12.80
1857.50	15	16-QAM	V	102	129	1 / 0	11.11	9.08	20.19	0.105	33.01	-12.82
1857.50	15	64-QAM	V	102	129	1 / 0	10.16	9.08	19.24	0.084	33.01	-13.77
1860.00	20	QPSK	V	102	129	1 / 0	12.43	9.09	21.52	0.142	33.01	-11.49
1882.50	20	QPSK	V	102	127	1 / 99	12.12	9.16	21.28	0.134	33.01	-11.74
1905.00	20	QPSK	V	117	125	1 / 0	11.20	9.24	20.44	0.111	33.01	-12.57
1860.00	20	16-QAM	V	102	129	1 / 0	11.21	9.09	20.30	0.107	33.01	-12.71
1860.00	20	64-QAM	V	102	129	1 / 0	10.07	9.09	19.16	0.082	33.01	-13.85
1860.00	20	QPSK	H	134	220	1 / 0	10.74	9.09	19.83	0.096	33.01	-13.18

Table 7-10. EIRP Data (Band 25/2)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 227 of 271

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	105	316	1 / 0	11.29	9.43	20.72	0.118	33.01	-12.29
2535.00	5	QPSK	H	100	318	1 / 0	11.63	9.39	21.02	0.127	33.01	-11.99
2567.50	5	QPSK	H	102	323	1 / 0	11.05	9.45	20.50	0.112	33.01	-12.51
2535.00	5	16-QAM	H	100	318	1 / 0	10.78	9.39	20.17	0.104	33.01	-12.84
2535.00	5	64-QAM	H	100	318	1 / 0	9.52	9.39	18.91	0.078	33.01	-14.10
2505.00	10	QPSK	H	105	316	1 / 0	11.65	9.43	21.08	0.128	33.01	-11.93
2535.00	10	QPSK	H	100	318	1 / 0	12.20	9.39	21.59	0.144	33.01	-11.42
2565.00	10	QPSK	H	102	323	1 / 0	12.13	9.44	21.57	0.144	33.01	-11.44
2565.00	10	16-QAM	H	102	323	1 / 0	10.38	9.44	19.82	0.096	33.01	-13.19
2565.00	10	64-QAM	H	102	323	1 / 0	9.39	9.44	18.83	0.076	33.01	-14.18
2507.50	15	QPSK	H	105	316	1 / 0	11.49	9.42	20.91	0.123	33.01	-12.10
2535.00	15	QPSK	H	100	318	1 / 0	11.80	9.39	21.19	0.132	33.01	-11.82
2562.50	15	QPSK	H	102	323	1 / 0	11.57	9.43	21.00	0.126	33.01	-12.01
2535.00	15	16-QAM	H	100	318	1 / 0	10.53	9.39	19.92	0.098	33.01	-13.09
2535.00	15	64-QAM	H	100	318	1 / 0	9.38	9.39	18.77	0.075	33.01	-14.24
2510.00	20	QPSK	H	105	316	1 / 0	11.51	9.42	20.93	0.124	33.01	-12.08
2535.00	20	QPSK	H	100	318	1 / 0	11.80	9.39	21.19	0.132	33.01	-11.82
2560.00	20	QPSK	H	102	323	1 / 0	11.31	9.42	20.73	0.118	33.01	-12.28
2535.00	20	16-QAM	H	100	318	1 / 0	10.77	9.39	20.16	0.104	33.01	-12.85
2535.00	20	64-QAM	H	100	318	1 / 0	9.53	9.39	18.92	0.078	33.01	-14.09
2535.00	10	QPSK	V	210	315	1 / 0	10.06	9.39	19.45	0.088	33.01	-13.56

Table 7-11. EIRP Data (Band 7)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 228 of 271

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	102	141	1 / 0	12.77	9.43	22.20	0.166	33.01	-10.81
2593.00	5	QPSK	H	100	135	1 / 0	14.50	9.55	24.05	0.254	33.01	-8.96
2687.50	5	QPSK	H	108	130	1 / 0	12.37	9.82	22.19	0.166	33.01	-10.82
2593.00	5	16-QAM	H	100	135	1 / 0	14.00	9.55	23.55	0.227	33.01	-9.46
2593.00	5	64-QAM	H	100	135	1 / 0	12.19	9.55	21.74	0.149	33.01	-11.27
2505.00	10	QPSK	H	102	141	1 / 0	12.77	9.43	22.19	0.166	33.01	-10.82
2593.00	10	QPSK	H	100	135	1 / 0	14.45	9.55	24.00	0.251	33.01	-9.01
2685.00	10	QPSK	H	108	130	1 / 0	12.47	9.82	22.29	0.169	33.01	-10.72
2593.00	10	16-QAM	H	100	135	1 / 0	13.82	9.55	23.37	0.217	33.01	-9.64
2593.00	10	64-QAM	H	100	135	1 / 0	11.91	9.55	21.46	0.140	33.01	-11.55
2507.50	15	QPSK	H	102	141	1 / 0	12.77	9.42	22.19	0.166	33.01	-10.82
2593.00	15	QPSK	H	100	135	1 / 0	14.47	9.55	24.02	0.253	33.01	-8.99
2682.50	15	QPSK	H	108	130	1 / 0	12.39	9.83	22.22	0.167	33.01	-10.79
2593.00	15	16-QAM	H	100	135	1 / 0	13.60	9.55	23.15	0.207	33.01	-9.86
2593.00	15	64-QAM	H	100	135	1 / 0	12.21	9.55	21.76	0.150	33.01	-11.25
2510.00	20	QPSK	H	102	141	1 / 0	12.90	9.42	22.32	0.171	33.01	-10.69
2593.00	20	QPSK	H	100	135	1 / 0	14.55	9.55	24.10	0.257	33.01	-8.91
2680.00	20	QPSK	H	108	130	1 / 0	12.73	9.83	22.56	0.181	33.01	-10.45
2593.00	20	16-QAM	H	100	135	1 / 0	14.37	9.55	23.92	0.247	33.01	-9.09
2593.00	20	64-QAM	H	100	135	1 / 0	13.03	9.55	22.58	0.181	33.01	-10.43
2593.00	20	QPSK	V	110	230	1 / 0	12.47	9.55	22.02	0.159	33.01	-10.99

Table 7-12. EIRP Data (Band 41 PC2)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 229 of 271

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	100	309	1 / 24	9.34	8.34	17.68	0.059	33.01	-15.33
2593.00	5	QPSK	H	100	310	1 / 24	10.30	8.04	18.34	0.068	33.01	-14.67
2687.50	5	QPSK	H	102	308	1 / 24	7.93	7.94	15.86	0.039	33.01	-17.15
2502.50	5	16-QAM	H	100	309	1 / 24	7.30	8.34	15.64	0.037	33.01	-17.37
2502.50	5	64-QAM	H	100	309	1 / 0	5.71	8.34	14.05	0.025	33.01	-18.96
2505.00	10	QPSK	H	100	309	1 / 49	11.60	8.33	19.94	0.099	33.01	-13.07
2593.00	10	QPSK	H	100	310	1 / 49	12.16	8.04	20.20	0.105	33.01	-12.81
2685.00	10	QPSK	H	102	308	1 / 49	10.12	7.93	18.05	0.064	33.01	-14.96
2505.00	10	16-QAM	H	100	309	1 / 49	9.96	8.33	18.30	0.068	33.01	-14.71
2505.00	10	64-QAM	H	100	309	1 / 0	9.19	8.33	17.53	0.057	33.01	-15.48
2507.50	15	QPSK	H	100	309	1 / 74	12.72	8.33	21.05	0.127	33.01	-11.96
2593.00	15	QPSK	H	100	310	1 / 74	13.09	8.04	21.13	0.130	33.01	-11.88
2682.50	15	QPSK	H	102	308	1 / 74	11.25	7.92	19.17	0.083	33.01	-13.84
2507.50	15	16-QAM	H	100	309	1 / 74	11.25	8.33	19.58	0.091	33.01	-13.43
2507.50	15	64-QAM	H	100	309	1 / 0	10.98	8.33	19.31	0.085	33.01	-13.70
2510.00	20	QPSK	H	100	309	1 / 99	13.19	8.33	21.52	0.142	33.01	-11.49
2593.00	20	QPSK	H	100	310	1 / 99	13.49	8.04	21.53	0.142	33.01	-11.48
2680.00	20	QPSK	H	102	308	1 / 99	11.71	7.91	19.62	0.092	33.01	-13.39
2510.00	20	16-QAM	H	100	309	1 / 99	12.03	8.33	20.36	0.109	33.01	-12.65
2510.00	20	64-QAM	H	100	309	1 / 0	11.72	8.33	20.05	0.101	33.01	-12.96
2498.50	5	16-QAM	V	100	267	1 / 24	10.51	8.35	18.86	0.077	33.01	-14.15

Table 7-13. EIRP Data (Band 41 PC3)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 230 of 271

7.9 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

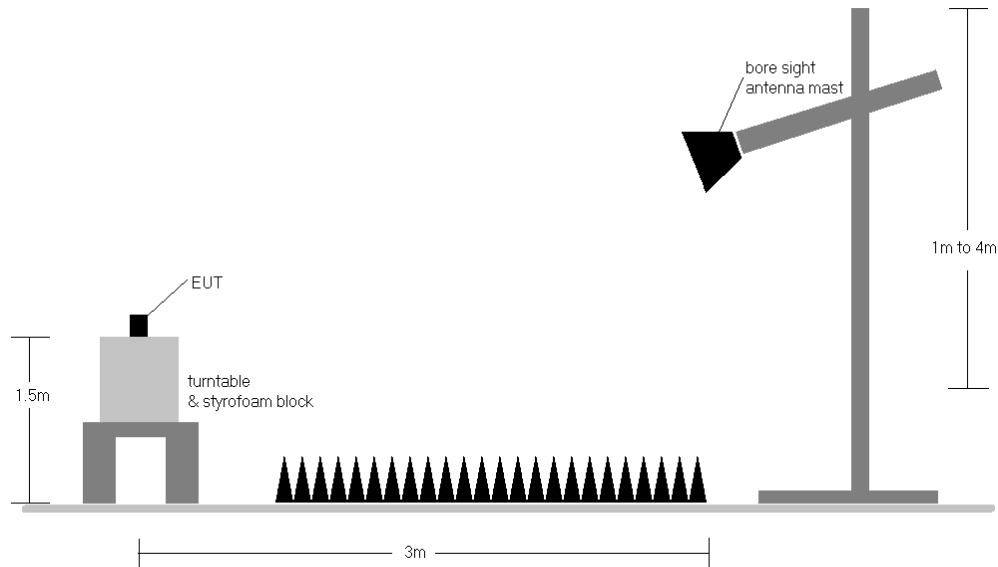


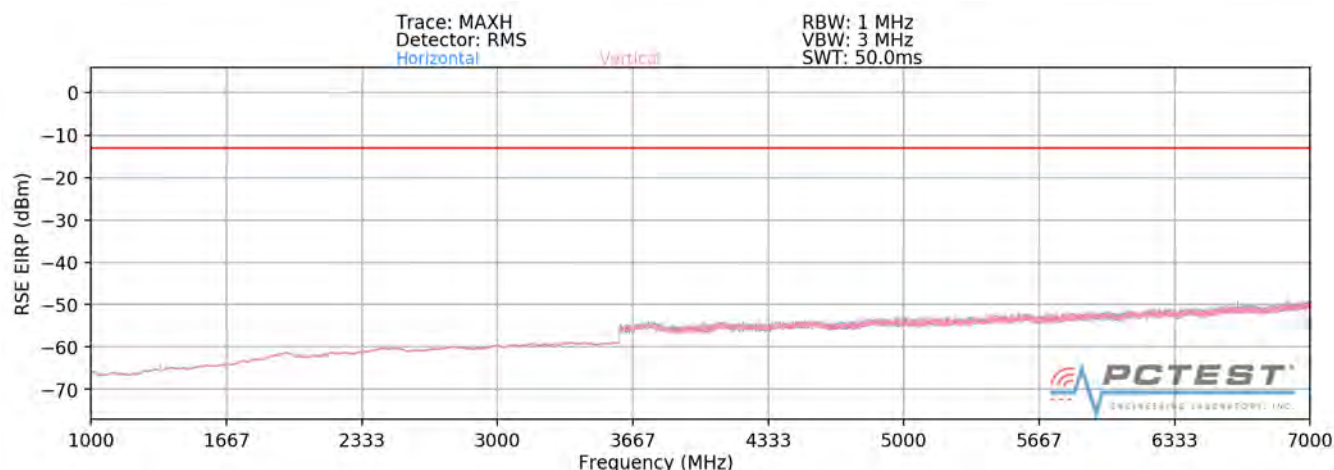
Figure 7-9. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 71



Plot 7-379. Radiated Spurious Plot above 1GHz (Band 71)

OPERATING FREQUENCY: 673.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1346.00	H	-	-	-78.01	9.18	-68.82	-55.8
2019.00	H	-	-	-74.68	9.52	-65.16	-52.2

Table 7-14. Radiated Spurious Data (Band 71 – Low Channel)

OPERATING FREQUENCY: 680.50 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1361.00	H	-	-	-77.84	9.05	-68.79	-55.8
2041.50	H	-	-	-74.64	9.40	-65.25	-52.2

Table 7-15. Radiated Spurious Data (Band 71 – Mid Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)					Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset				Page 233 of 271	

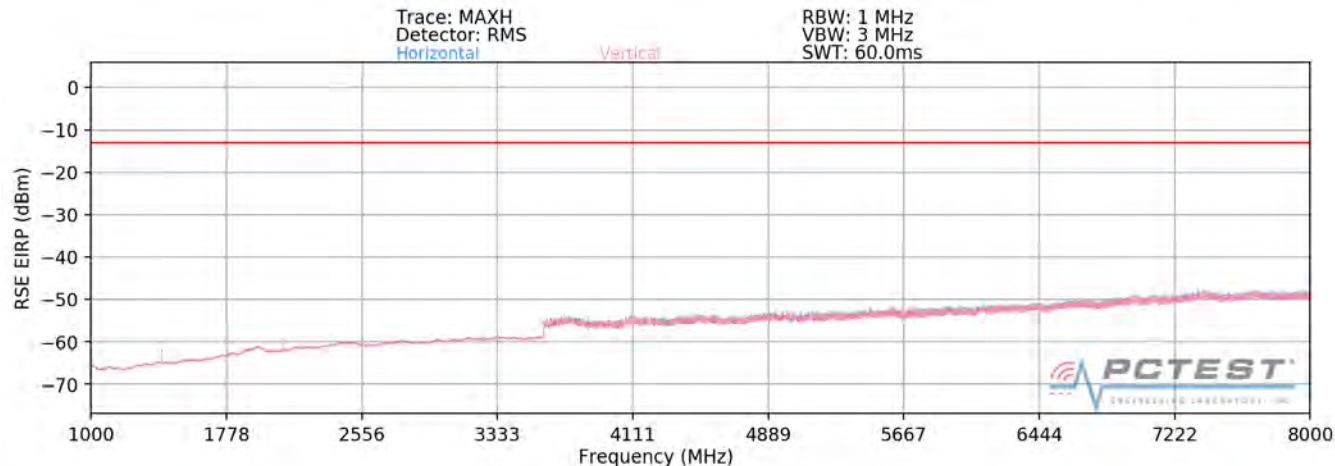
OPERATING FREQUENCY: 688.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1376.00	H	-	-	-77.59	8.89	-68.70	-55.7
2064.00	H	-	-	-74.35	9.22	-65.13	-52.1

Table 7-16. Radiated Spurious Data (Band 71 – High Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 234 of 271

Band 12/17



Plot 7-380. Radiated Spurious Plot above 1GHz (Band 12/17)

OPERATING FREQUENCY: 704.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	H	-	-	-70.76	8.64	-62.12	-49.1
2112.00	H	146	254	-64.10	8.91	-55.19	-42.2
2816.00	H	-	-	-67.17	8.16	-59.01	-46.0
3520.00	H	-	-	-67.19	9.13	-58.06	-45.1

Table 7-17. Radiated Spurious Data (Band 12/17 – Low Channel)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 235 of 271

OPERATING FREQUENCY: 707.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	-	-	-70.60	8.63	-61.97	-49.0
2122.50	H	108	254	-64.71	8.92	-55.79	-42.8
2830.00	H	-	-	-66.39	8.05	-58.35	-45.3
3537.50	H	-	-	-67.26	8.84	-58.42	-45.4

Table 7-18. Radiated Spurious Data (Band 12/17 – Mid Channel)

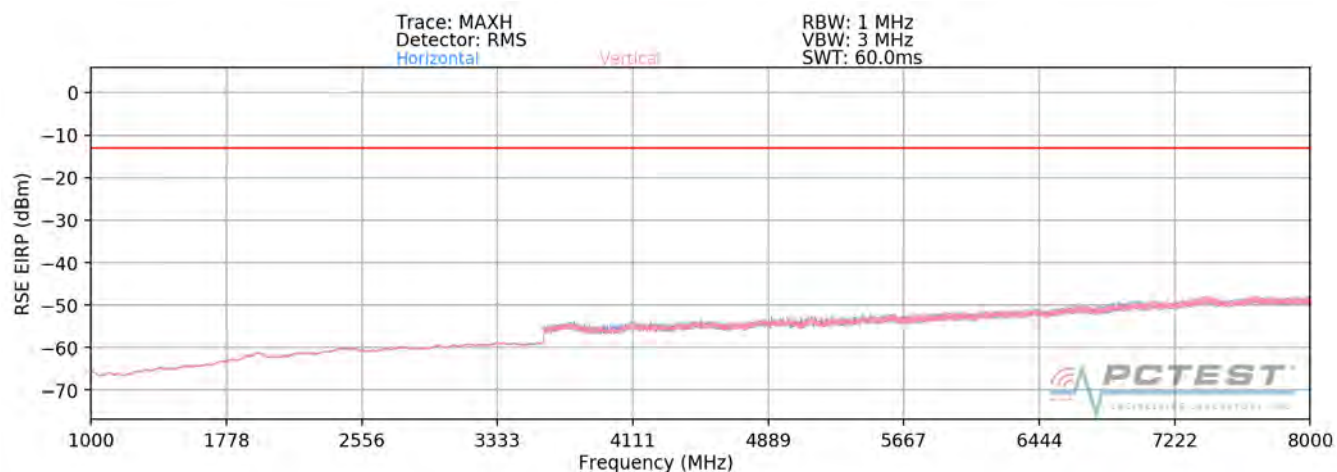
OPERATING FREQUENCY: 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	H	-	-	-70.73	8.62	-62.12	-49.1
2133.00	H	105	4	-67.63	8.94	-58.69	-45.7
2844.00	H	-	-	-66.87	7.92	-58.95	-46.0
3555.00	H	-	-	-67.44	8.54	-58.90	-45.9

Table 7-19. Radiated Spurious Data (Band 12/17 – High Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 236 of 271

Band 13



Plot 7-381. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 779.50 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2338.50	H	-	-	-72.53	8.75	-63.78	-50.8
3118.00	H	-	-	-71.51	8.46	-63.05	-50.1

Table 7-20. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY: 782.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	-	-	-72.49	8.76	-63.73	-50.7
3128.00	H	-	-	-71.04	8.42	-62.63	-49.6
3910.00	H	-	-	-70.97	8.79	-62.18	-49.2

Table 7-21. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 237 of 271

OPERATING FREQUENCY: 784.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2353.50	H	-	-	-72.20	8.76	-63.44	-50.4
3138.00	H	-	-	-70.75	8.37	-62.38	-49.4

Table 7-22. Radiated Spurious Data (Band 13 – High Channel)

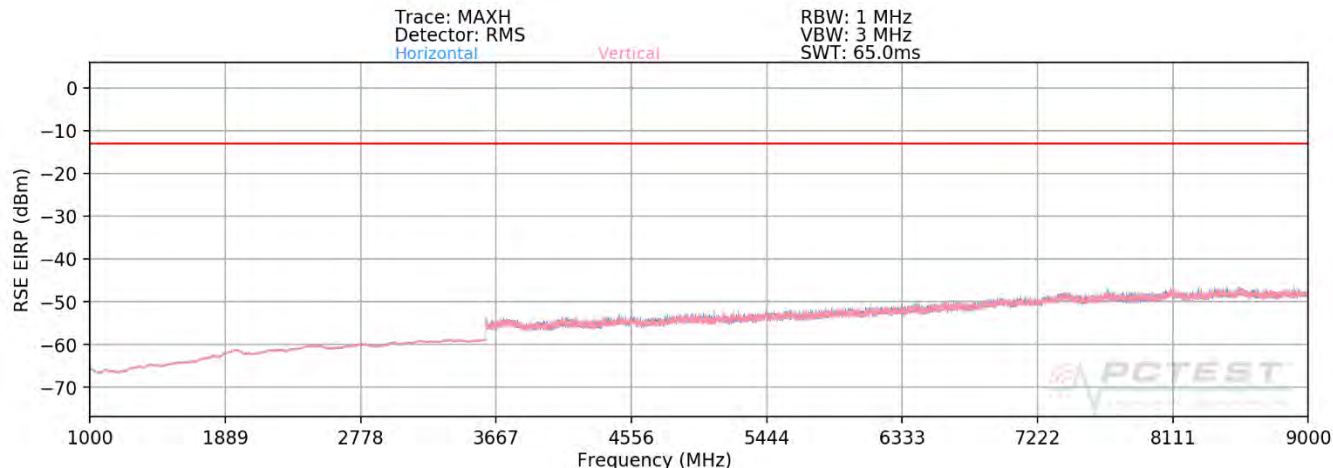
MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-75.46	8.73	-66.73	-26.7
1564.00	H	-	-	-75.69	8.80	-66.89	-26.9
1569.00	H	-	-	-75.80	8.87	-66.93	-26.9

Table 7-23. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 238 of 271

Band 26/5



Plot 7-382. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY: 829.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	H	-	-	-78.08	9.52	-68.56	-55.6
2487.00	H	-	-	-70.04	8.37	-61.67	-48.7

Table 7-24. Radiated Spurious Data (Band 26/5 – Low Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 239 of 271

OPERATING FREQUENCY: 836.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	398	263	-75.15	9.56	-65.59	-52.6
2509.50	H	-	-	-69.48	8.33	-61.15	-48.1
3346.00	H	-	-	-67.95	8.59	-59.36	-46.4

Table 7-25. Radiated Spurious Data (Band 26/5 – Mid Channel)

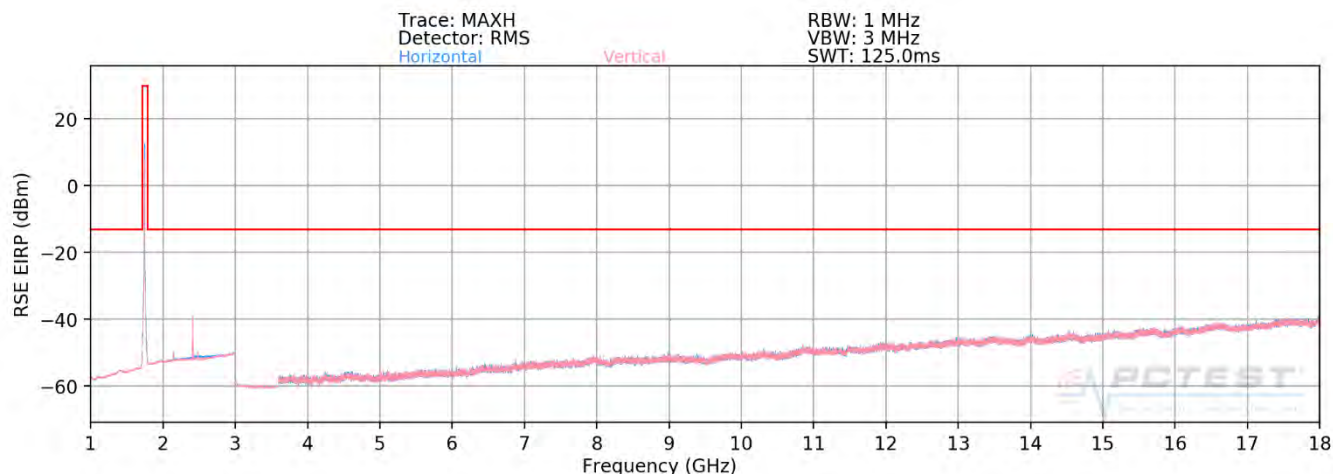
OPERATING FREQUENCY: 844.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	H	360	168	-75.80	9.60	-66.20	-53.2
2532.00	H	-	-	-70.31	8.30	-62.01	-49.0
3376.00	H	-	-	-68.86	8.71	-60.15	-47.2

Table 7-26. Radiated Spurious Data (Band 26/5 – High Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 240 of 271

Band 66/4



Plot 7-383. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1720.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	H	-	-	-71.08	9.14	-61.94	-48.9
5160.00	H	-	-	-73.62	12.59	-61.03	-48.0

Table 7-27. Radiated Spurious Data (Band 66/4 – Low Channel)

OPERATING FREQUENCY: 1745.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-71.65	9.16	-62.49	-49.5
5235.00	H	-	-	-74.00	12.92	-61.08	-48.1

Table 7-28. Radiated Spurious Data (Band 66/4 – Mid Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)					Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset				Page 241 of 271	

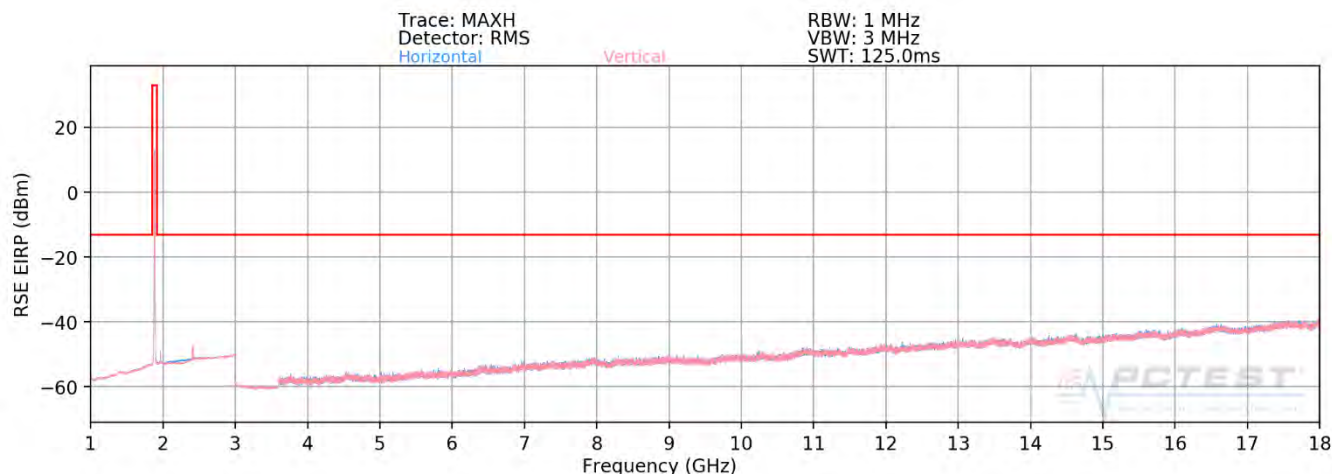
OPERATING FREQUENCY: 1770.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	H	-	-	-70.61	8.82	-61.79	-48.8
5310.00	H	-	-	-73.78	13.10	-60.68	-47.7

Table 7-29. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 242 of 271

Band 25/2



Plot 7-384. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY: 1860.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	H	-	-	-71.27	8.87	-62.40	-49.4
5580.00	H	-	-	-73.59	13.05	-60.54	-47.5

Table 7-30. Radiated Spurious Data (Band 25/2 – Low Channel)

OPERATING FREQUENCY: 1882.50 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-70.87	9.16	-61.71	-48.7
5647.50	H	-	-	-73.05	13.15	-59.90	-46.9

Table 7-31. Radiated Spurious Data (Band 25/2 – Mid Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)					Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset				Page 243 of 271	

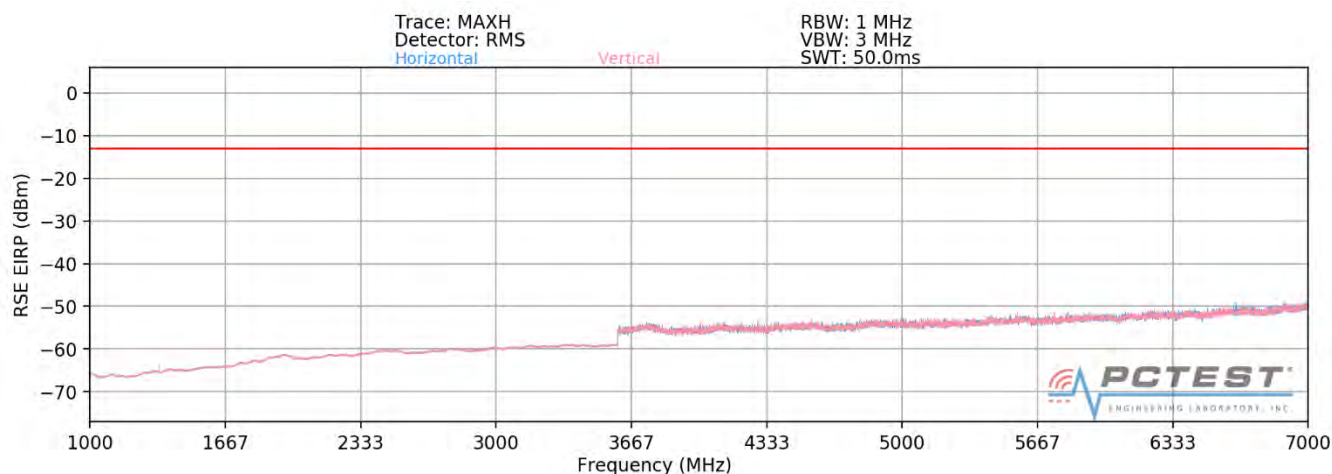
OPERATING FREQUENCY: 1905.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	-	-	-70.99	9.25	-61.74	-48.7
5715.00	H	-	-	-73.27	13.13	-60.14	-47.1

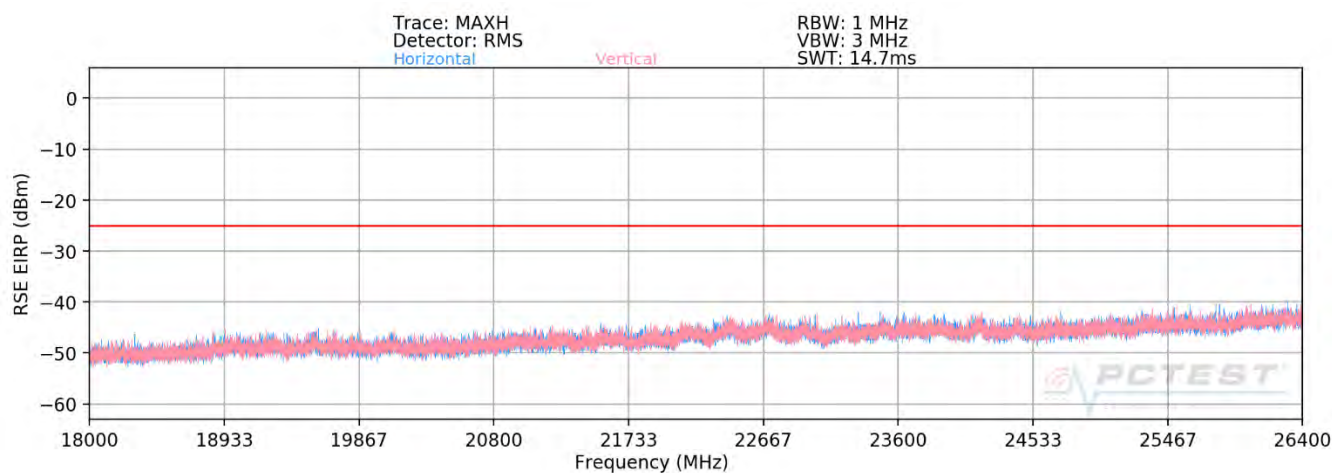
Table 7-32. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 244 of 271

Band 7



Plot 7-385. Radiated Spurious Plot 1GHz - 18GHz (Band 7)



Plot 7-386. Radiated Spurious Plot 18GHz - 26.5GHz (Band 7)

OPERATING FREQUENCY: 2505.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 MHz

DISTANCE: 3 meters

LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5010.00	H	-	-	-72.51	11.87	-60.64	-35.6
7515.00	H	-	-	-68.00	10.64	-57.36	-32.4

Table 7-33. Radiated Spurious Data (Band 7 - Low Channel)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 245 of 271	

OPERATING FREQUENCY: 2535.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	H	-	-	-72.98	12.09	-60.89	-35.9
7605.00	H	-	-	-67.65	10.74	-56.90	-31.9

Table 7-34. Radiated Spurious Data (Band 7 – Mid Channel)

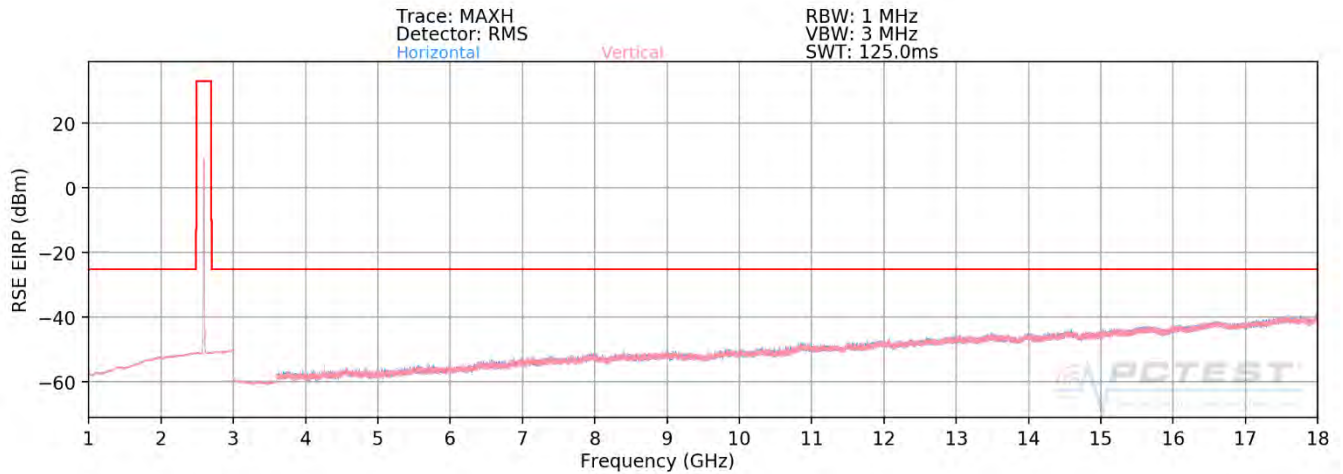
OPERATING FREQUENCY: 2565.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5130.00	H	-	-	-72.93	12.40	-60.53	-35.5
7695.00	H	-	-	-67.26	10.77	-56.49	-31.5

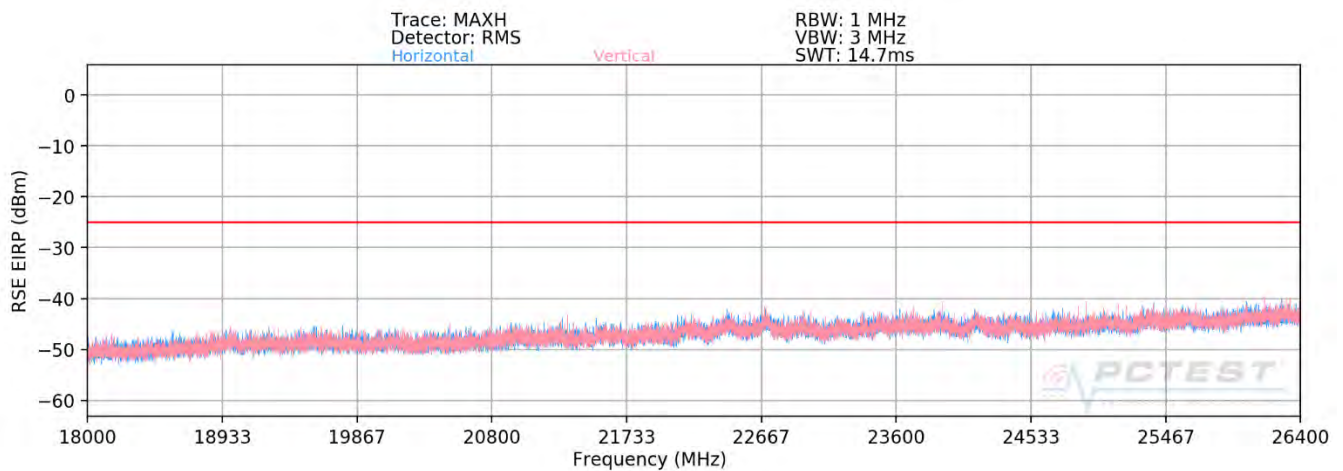
Table 7-35. Radiated Spurious Data (Band 7 – High Channel)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset			Page 246 of 271

Band 41 PC2



Plot 7-387. Radiated Spurious Plot 1GHz - 18GHz (Band 41 PC2)



Plot 7-388. Radiated Spurious Plot 18GHz - 26.5GHz (Band 41 PC2)

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 247 of 271

OPERATING FREQUENCY: 2510.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5020.00	V	-	-	-75.80	11.91	-63.89	-38.9
7530.00	V	-	-	-71.50	10.67	-60.83	-35.8
10040.00	V	212	34	-69.51	11.99	-57.52	-32.5
12550.00	V	144	359	-69.65	13.56	-56.09	-31.1
15060.00	V	-	-	-68.81	13.58	-55.23	-30.2
17570.00	V	-	-	-62.48	11.59	-50.89	-25.9

Table 7-36. Radiated Spurious Data (Band 41 PC2 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	V	-	-	-76.15	12.70	-63.45	-38.5
7779.00	V	-	-	-70.78	10.67	-60.11	-35.1
10372.00	V	113	30	-67.28	12.42	-54.85	-29.9
12965.00	V	176	3	-68.14	13.29	-54.85	-29.9
15558.00	V	-	-	-73.95	16.33	-57.62	-32.6
18151.00	V	-	-	-68.51	11.46	-57.05	-32.0

Table 7-37. Radiated Spurious Data (Band 41 PC2 – Mid Channel)

FCC ID: A3LSMA505U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset			Page 248 of 271

OPERATING FREQUENCY: 2680.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	V	-	-	-76.12	13.10	-63.02	-38.0
8040.00	V	-	-	-71.73	11.60	-60.14	-35.1
10720.00	V	236	3	-57.84	11.99	-45.85	-20.9
13400.00	V	353	340	-64.82	13.56	-51.26	-26.3
16080.00	V	-	-	-71.03	13.58	-57.45	-32.5
18760.00	V	-	-	-67.05	11.76	-55.29	-30.3

Table 7-38. Radiated Spurious Data (Band 41 PC2 – High Channel)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 249 of 271

7.10 Uplink Carrier Aggregation Radiated Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedure Used

KDB 971168 D01 v02r02 – Section 5.8

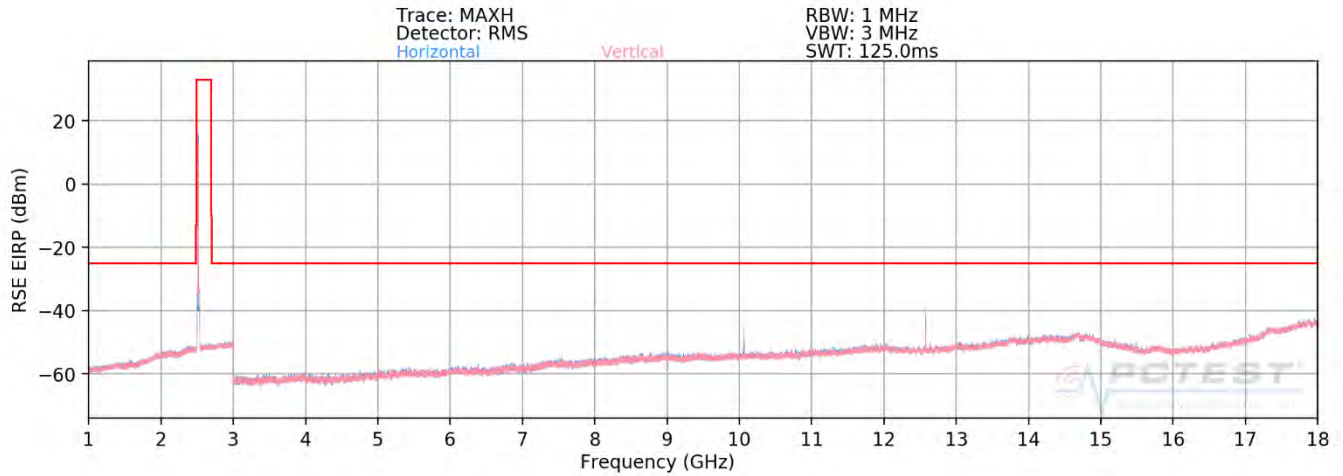
ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

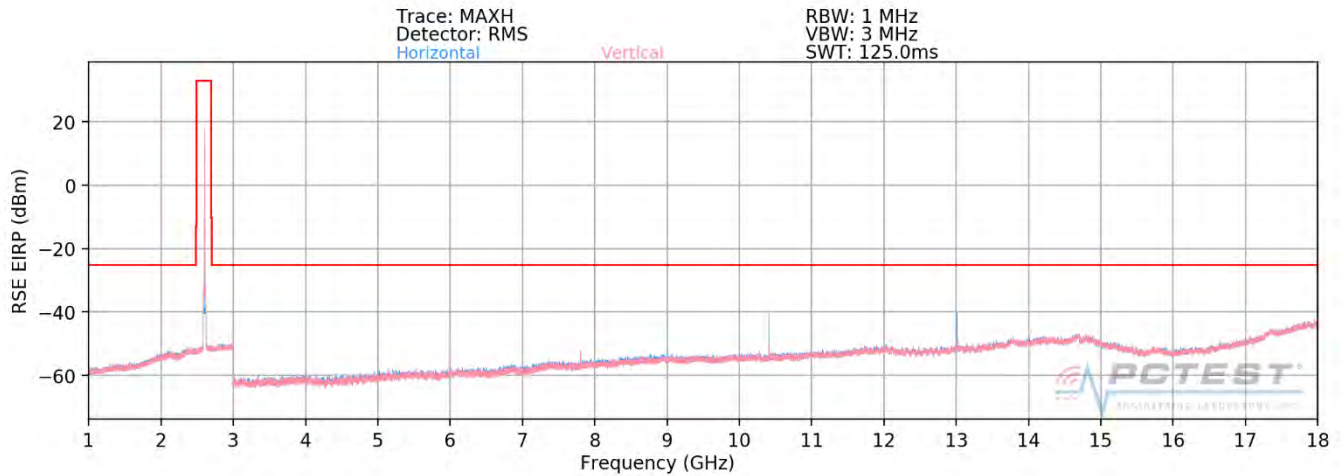
1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. No. of sweep points $> 2 \times$ span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

FCC ID: A3LSMA505U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 250 of 271

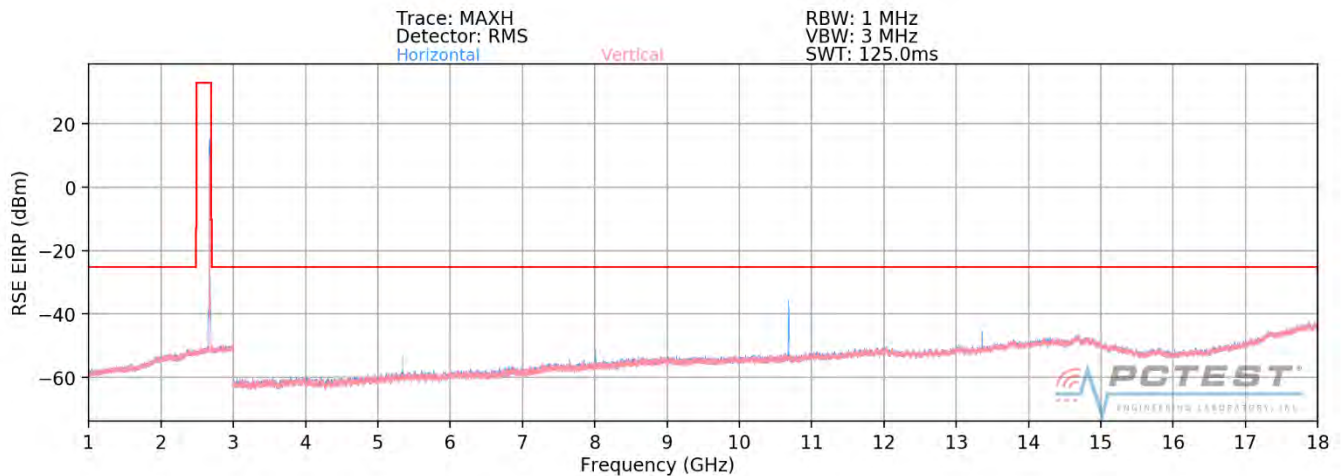
Uplink CA Configuration 41C PC3



Plot 7-389. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



Plot 7-390. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)



Plot 7-391. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 99 – High Channel)

FCC ID: A3LSMA505U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset		Page 251 of 271

OPERATING FREQUENCY (PCC): 2506.00 MHz
 OPERATING FREQUENCY (SCC): 2525.80 MHz
 CHANNEL (PCC): 39750
 CHANNEL (SCC): 39948
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	H	-	-	-75.26	11.91	-63.36	-38.4
7518.00	H	-	-	-71.05	10.67	-60.38	-35.4
10024.00	H	153	31	-70.11	11.99	-58.12	-33.1
12530.00	H	156	6	-60.37	13.56	-46.81	-21.8
15036.00	H	-	-	-68.85	13.58	-55.27	-30.3
17542.00	H	-	-	-59.77	11.59	-48.17	-23.2

Table 7-39. Radiated Spurious Data (Band 41 ULCA – Low Channel)

OPERATING FREQUENCY (PCC): 2593.00 MHz
 OPERATING FREQUENCY (SCC): 2612.80 MHz
 CHANNEL (PCC): 40620
 CHANNEL (SCC): 40818
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-76.51	12.70	-63.81	-38.8
7779.00	H	-	-	-72.20	10.67	-61.53	-36.5
10372.00	H	158	314	-59.63	12.42	-47.20	-22.2
12965.00	H	178	251	-58.16	13.29	-44.87	-19.9
15558.00	H	-	-	-72.73	16.33	-56.40	-31.4
18151.00	H	-	-	-68.27	11.46	-56.81	-31.8

Table 7-40. Radiated Spurious Data (Band 41 ULCA – Mid Channel)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903290047-03.A3L	Test Dates: 03/29-05/09/2019	EUT Type: Portable Handset	Page 252 of 271

OPERATING FREQUENCY (PCC): 2680.00 MHz
 OPERATING FREQUENCY (SCC): 2660.20 MHz
 CHANNEL (PCC): 41490
 CHANNEL (SCC): 41292
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	156	12	-33.52	-29.30	-62.82	-37.8
8040.00	H	158	91	-28.22	-27.58	-55.81	-30.8
10720.00	H	159	296	-18.34	-25.20	-43.54	-18.5
13400.00	H	354	349	-27.00	-23.73	-50.73	-25.7
16080.00	H	-	-	-34.31	-22.88	-57.19	-32.2
18760.00	H	-	-	-27.87	-27.43	-55.30	-30.3

Table 7-41. Radiated Spurious Data (Band 41 ULCA – High Channel)

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7.11 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

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Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz
 CHANNEL: 133297
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	680,500,190	190	0.0000279
100 %		- 20	680,499,627	-373	-0.0000548
100 %		- 10	680,499,959	-41	-0.0000060
100 %		0	680,499,733	-267	-0.0000392
100 %		+ 10	680,500,351	351	0.0000516
100 %		+ 20	680,499,946	-54	-0.0000079
100 %		+ 30	680,500,167	167	0.0000245
100 %		+ 40	680,499,557	-443	-0.0000651
100 %		+ 50	680,499,959	-41	-0.0000060
BATT. ENDPOINT	3.45	+ 20	680,499,743	-257	-0.0000378

Table 7-42. Frequency Stability Data (Band 71)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 71 Frequency Stability Measurements

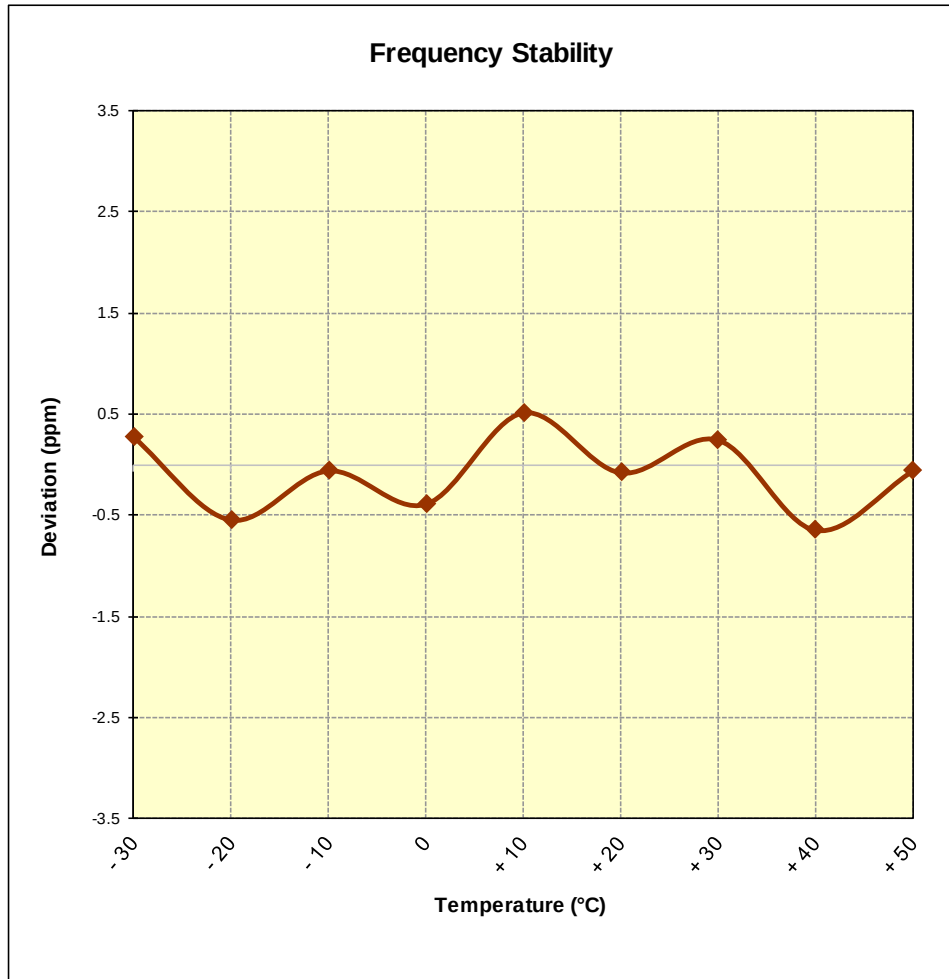


Figure 7-10. Frequency Stability Graph (Band 71)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23790
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	707,499,692	-308	-0.0000435
100 %		- 20	707,499,731	-269	-0.0000380
100 %		- 10	707,500,151	151	0.0000213
100 %		0	707,500,166	166	0.0000235
100 %		+ 10	707,499,566	-434	-0.0000613
100 %		+ 20	707,499,958	-42	-0.0000059
100 %		+ 30	707,499,917	-83	-0.0000117
100 %		+ 40	707,500,097	97	0.0000137
100 %		+ 50	707,499,940	-60	-0.0000085
BATT. ENDPOINT	3.45	+ 20	707,499,931	-69	-0.0000098

Table 7-43. Frequency Stability Data (Band 12)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 12 Frequency Stability Measurements

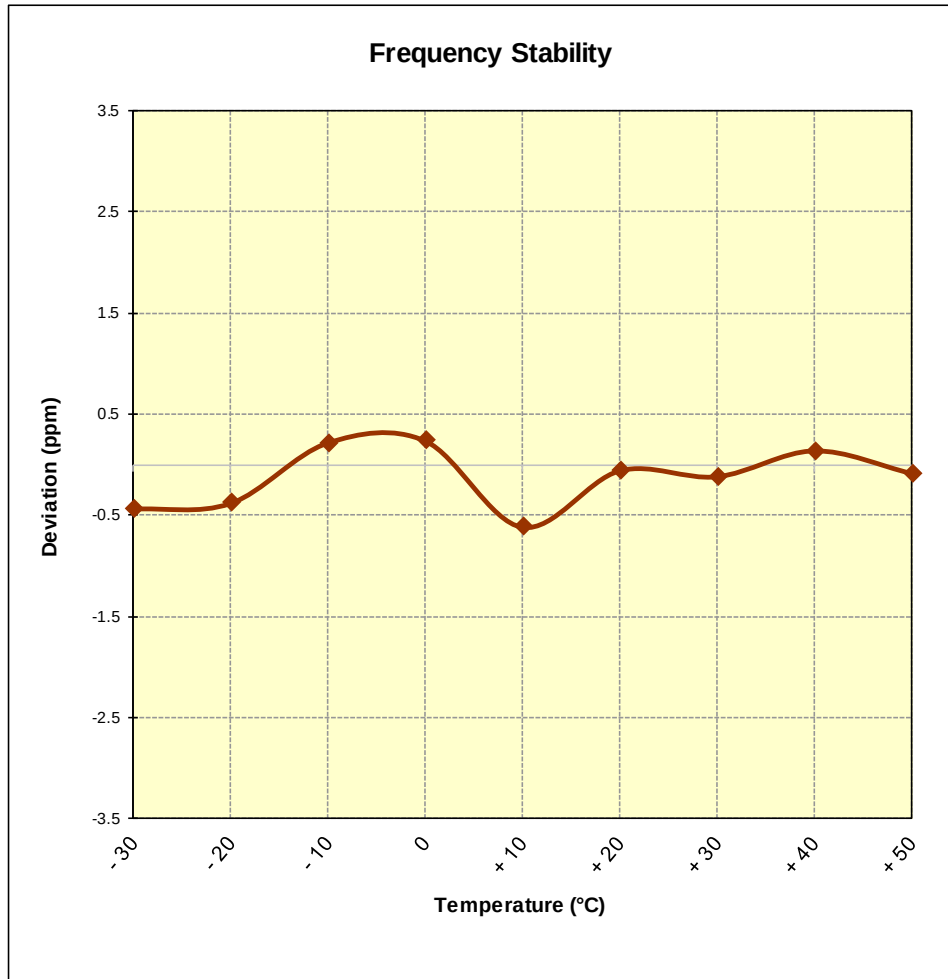


Figure 7-11. Frequency Stability Graph (Band 12)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	781,999,976	-24	-0.0000031
100 %		- 20	781,999,841	-159	-0.0000203
100 %		- 10	782,000,170	170	0.0000217
100 %		0	782,000,354	354	0.0000453
100 %		+ 10	782,000,245	245	0.0000313
100 %		+ 20	782,000,032	32	0.0000041
100 %		+ 30	782,000,008	8	0.0000010
100 %		+ 40	782,000,244	244	0.0000312
100 %		+ 50	781,999,885	-115	-0.0000147
BATT. ENDPOINT	3.45	+ 20	782,000,189	189	0.0000242

Table 7-44. Frequency Stability Data (Band 13)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 13 Frequency Stability Measurements

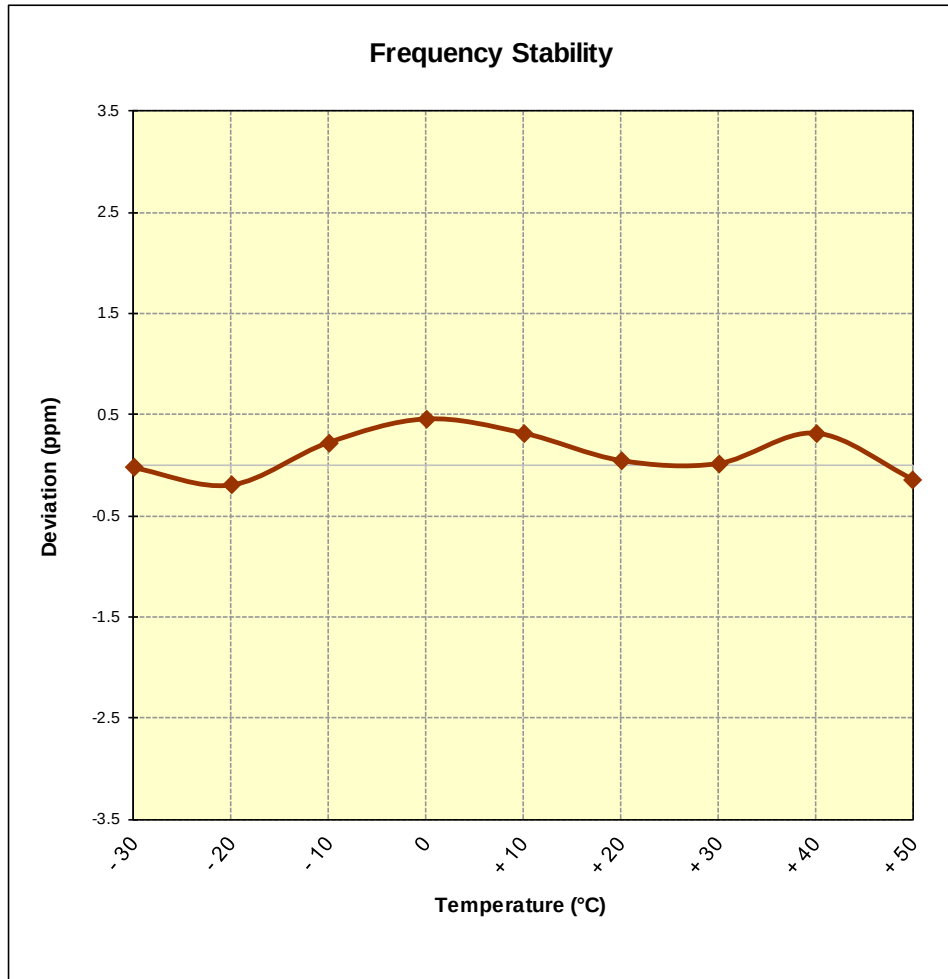


Figure 7-12. Frequency Stability Graph (Band 13)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 26 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz
 CHANNEL: 26865
 REFERENCE VOLTAGE: 4.27 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	831,499,890	-110	-0.0000132
100 %		- 20	831,500,057	57	0.0000069
100 %		- 10	831,500,140	140	0.0000168
100 %		0	831,499,879	-121	-0.0000146
100 %		+ 10	831,499,566	-434	-0.0000522
100 %		+ 20	831,500,014	14	0.0000017
100 %		+ 30	831,499,859	-141	-0.0000170
100 %		+ 40	831,499,944	-56	-0.0000067
100 %		+ 50	831,500,299	299	0.0000360
BATT. ENDPOINT	3.45	+ 20	831,500,092	92	0.0000111

Table 7-45. Frequency Stability Data (Band 26)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 26 Frequency Stability Measurements

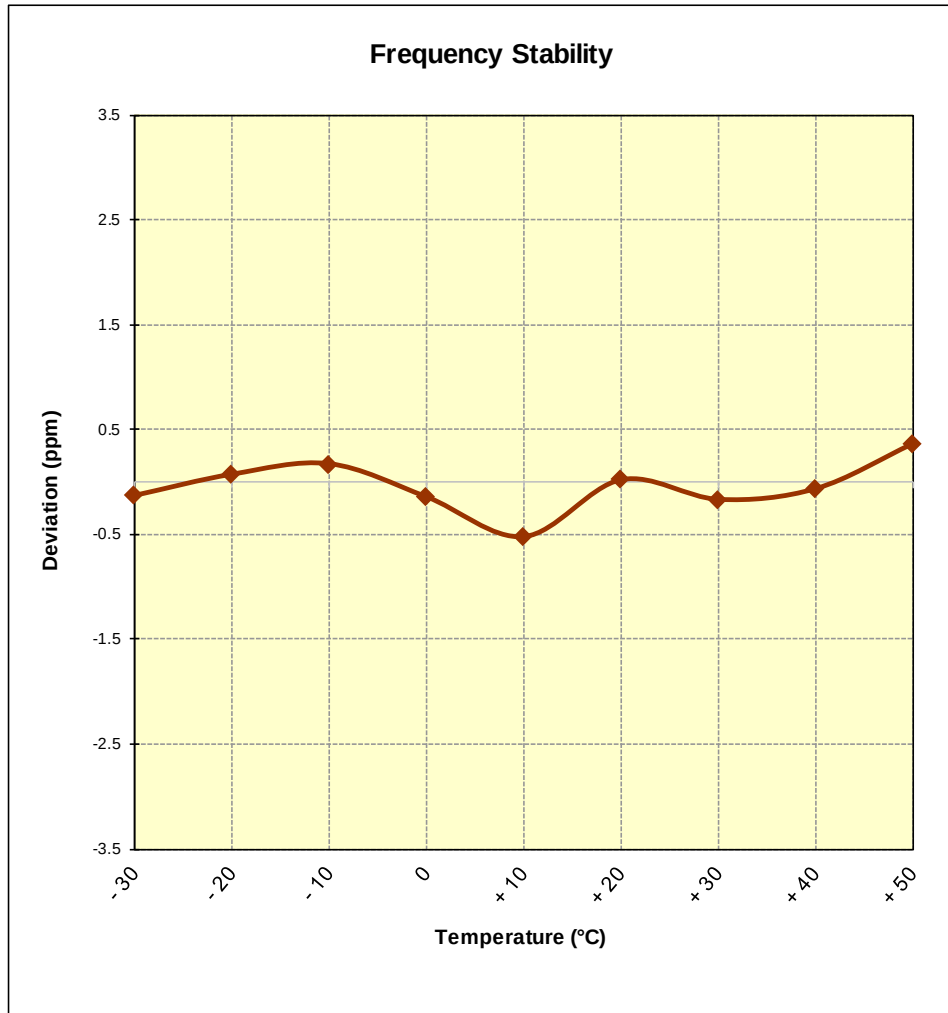


Figure 7-13. Frequency Stability Graph (Band 26)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 66 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz
 CHANNEL: 132322
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,744,999,804	-196	-0.0000112
100 %		- 20	1,745,000,037	37	0.0000021
100 %		- 10	1,744,999,588	-412	-0.0000236
100 %		0	1,744,999,689	-311	-0.0000178
100 %		+ 10	1,745,000,284	284	0.0000163
100 %		+ 20	1,745,000,451	451	0.0000258
100 %		+ 30	1,744,999,936	-64	-0.0000037
100 %		+ 40	1,745,000,189	189	0.0000108
100 %		+ 50	1,745,000,110	110	0.0000063
BATT. ENDPOINT	3.45	+ 20	1,745,000,119	119	0.0000068

Table 7-46. Frequency Stability Data (Band 66)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 66 Frequency Stability Measurements

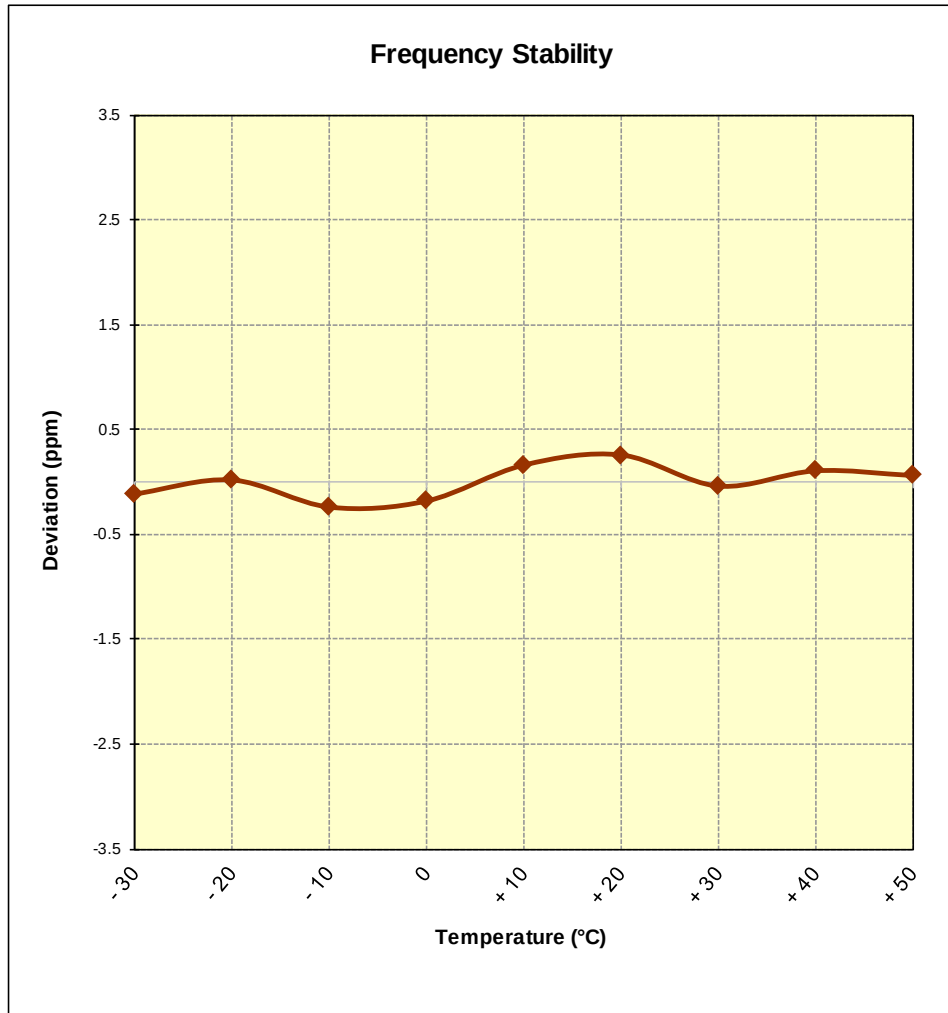


Figure 7-14. Frequency Stability Graph (Band 66)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 25 Frequency Stability Measurements

OPERATING FREQUENCY: 1,882,500,000 Hz
 CHANNEL: 26365
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,882,499,845	-155	-0.0000082
100 %		- 20	1,882,499,870	-130	-0.0000069
100 %		- 10	1,882,500,067	67	0.0000036
100 %		0	1,882,500,256	256	0.0000136
100 %		+ 10	1,882,499,923	-77	-0.0000041
100 %		+ 20	1,882,499,637	-363	-0.0000193
100 %		+ 30	1,882,499,619	-381	-0.0000202
100 %		+ 40	1,882,500,217	217	0.0000115
100 %		+ 50	1,882,500,307	307	0.0000163
BATT. ENDPOINT	3.45	+ 20	1,882,500,072	72	0.0000038

Table 7-47. Frequency Stability Data (Band 25)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 25 Frequency Stability Measurements

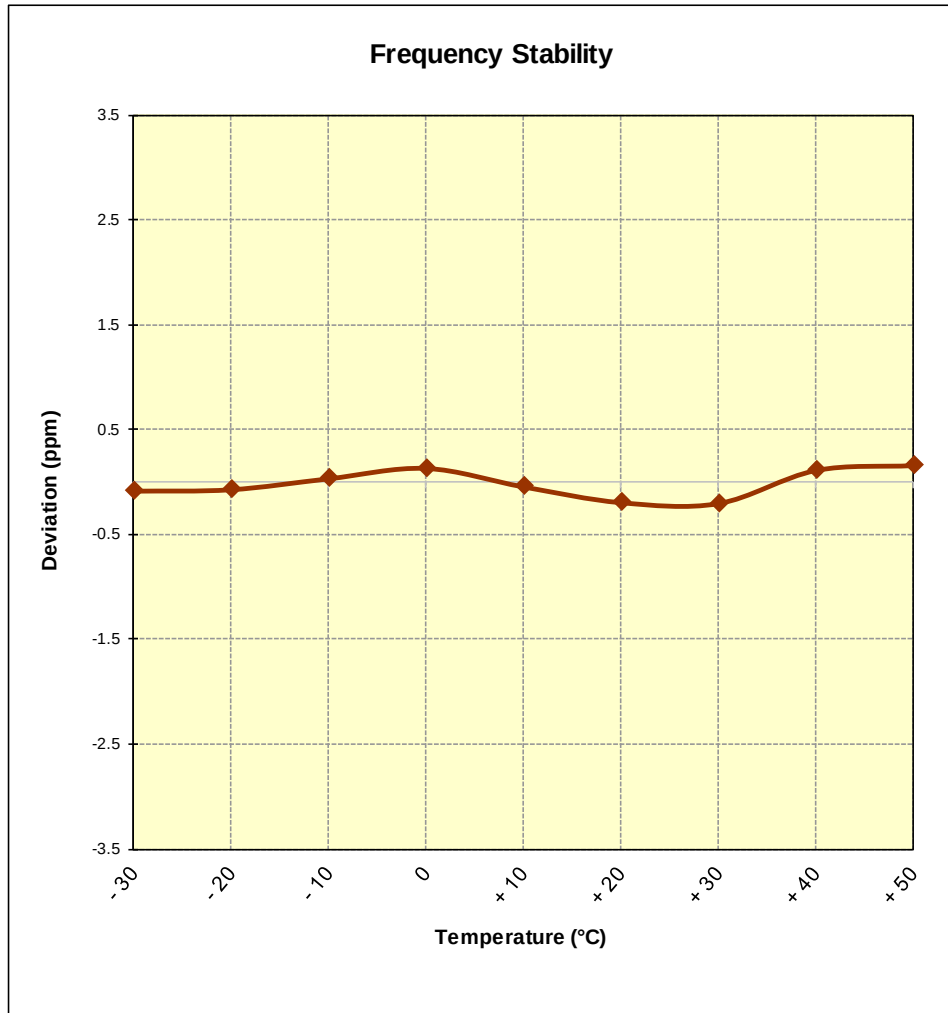


Figure 7-15. Frequency Stability Graph (Band 25)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 7 Frequency Stability Measurements

OPERATING FREQUENCY: 2,535,000,000 Hz
 CHANNEL: 21100
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	2,535,000,418	418	0.0000165
100 %		- 20	2,534,999,934	-66	-0.0000026
100 %		- 10	2,535,000,106	106	0.0000042
100 %		0	2,535,000,140	140	0.0000055
100 %		+ 10	2,535,000,046	46	0.0000018
100 %		+ 20	2,534,999,946	-54	-0.0000021
100 %		+ 30	2,534,999,813	-187	-0.0000074
100 %		+ 40	2,535,000,152	152	0.0000060
100 %		+ 50	2,534,999,970	-30	-0.0000012
BATT. ENDPOINT		+ 20	2,534,999,714	-286	-0.0000113

Table 7-48. Frequency Stability Data (Band 7)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 7 Frequency Stability Measurements

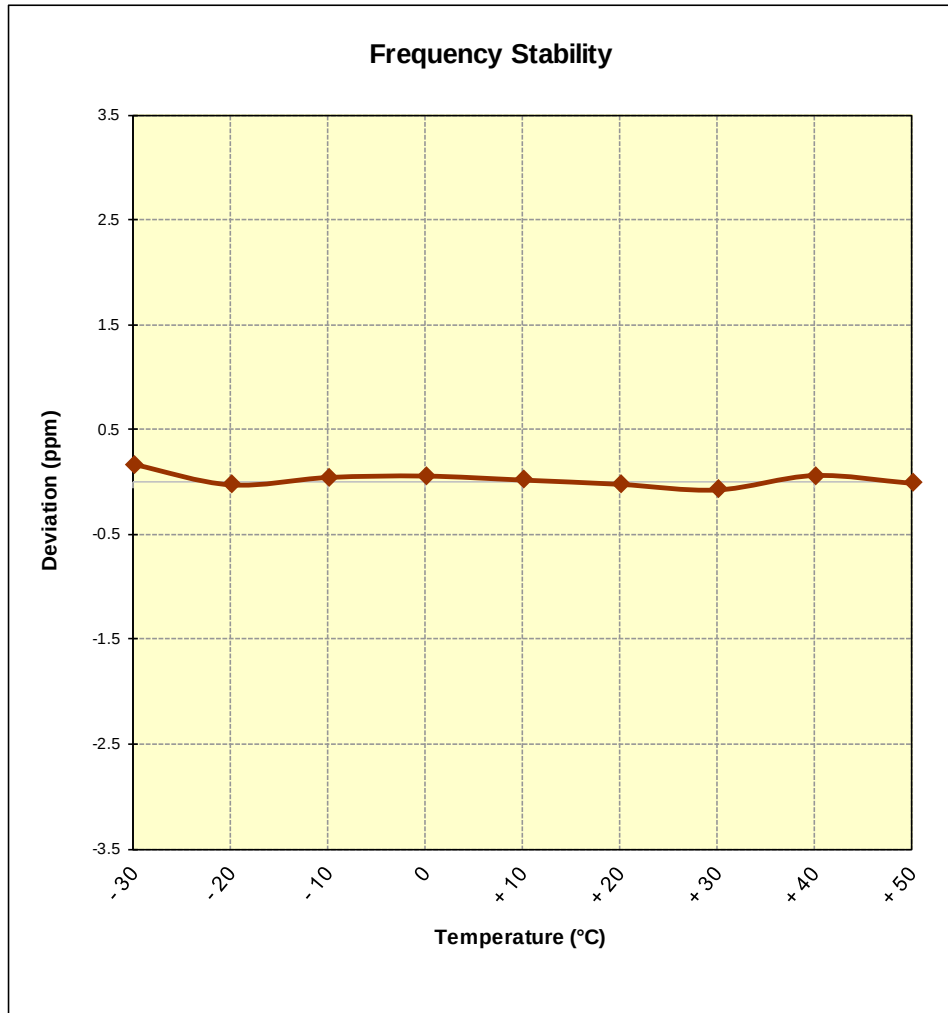


Figure 7-16. Frequency Stability Graph (Band 7)

FCC ID: A3LSMA505U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz
 CHANNEL: 40620
 REFERENCE VOLTAGE: 4.27 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	2,592,999,942	-58	-0.0000022
100 %		- 20	2,593,000,046	46	0.0000018
100 %		- 10	2,593,000,273	273	0.0000105
100 %		0	2,592,999,642	-358	-0.0000138
100 %		+ 10	2,592,999,992	-8	-0.0000003
100 %		+ 20	2,593,000,200	200	0.0000077
100 %		+ 30	2,593,000,014	14	0.0000005
100 %		+ 40	2,593,000,016	16	0.0000006
100 %		+ 50	2,592,999,814	-186	-0.0000072
BATT. ENDPOINT	3.45	+ 20	2,593,000,005	5	0.0000002

Table 7-49. Frequency Stability Data (Band 41)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 41 Frequency Stability Measurements

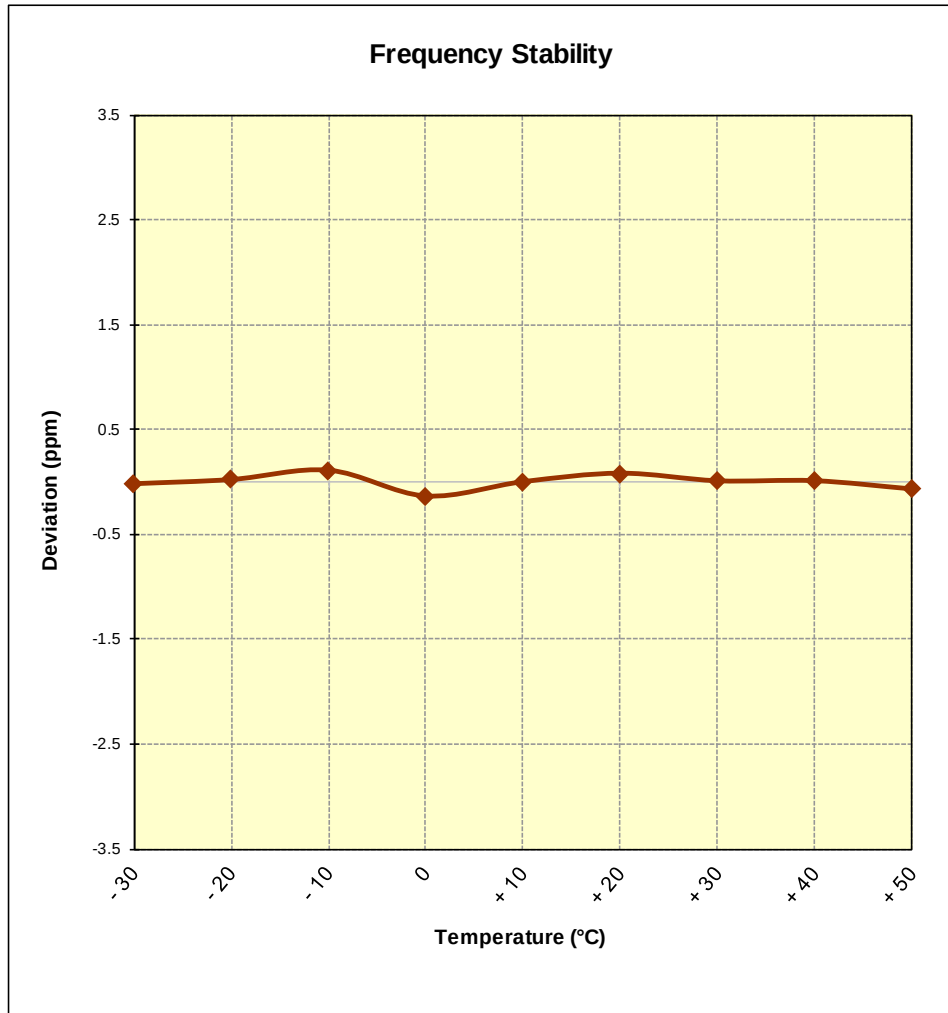


Figure 7-17. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset** **FCC ID: A3LSMA505U** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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